TOSHIBA

Carrier

# Super Digital Inverter / RAV Series

# 2010 Technical training

TOSHIBA Carrier

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# System Line up & Model Numbers

| Outdoor model name / Indoor model name | 18K | 24 K | 30 K | 36 K | 42 K |
|---|---|---|---|---|---|
| 4way cassette | RAV-SP180AT2-UL / RAV-SP180UT-UL | RAV-SP240AT2-UL / RAV-SP240UT-UL | RAV-SP300AT2-UL / RAV-SP300UT-UL | RAV-SP360AT2-UL / RAV-SP360UT-UL | RAV-SP420AT2-UL / RAV-SP420UT-UL |
| Ceiling | RAV-SP180AT2-UL / RAV-SP180CT-UL | RAV-SP240AT2-UL / RAV-SP240CT-UL | RAV-SP300AT2-UL / RAV-SP300CT-UL | RAV-SP360AT2-UL / RAV-SP360CT-UL | RAV-SP420AT2-UL / RAV-SP420CT-UL |
| High wall | RAV-SP180AT2-UL / RAV-SP180KRT-UL | RAV-SP240AT2-UL / RAV-SP240KRT-UL | | | |



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# System Performance

## Cassettes

| Product Model / Item | FCU / CDU | RAV-SP180UT-UL / RAV-SP180AT2-UL | RAV-SP240UT-UL / RAV-SP240AT2-UL | RAV-SP300UT-UL / RAV-SP300AT2-UL | RAV-SP360UT-UL / RAV-SP360AT2-UL | RAV-SP420UT-UL / RAV-SP420AT2-UL |
|---|---|---|---|---|---|---|
| Cooling Rated Capacity BTUH | | 19,000 | 25,000 | 32,000 | 36,400 | 40,500 |
| SEER | | 20.5 | 20.7 | 21.0 | 21.0 | 19.0 |
| EER | | 10.7 | 11.0 | 14.0 | 13.0 | 11.5 |
| Heating Rated Capacity BTUH | | 18,800 | 26,000 | 33,400 | 36,000 | 46,000 |
| HSPF | | **11.5** | **9.5** | **11.0** | **11.9** | **10.3** |

## Under Ceiling

| Product Model / Item | FCU / CDU | RAV-SP180CT-UL / RAV-SP180AT2-UL | RAV-SP240CT-UL / RAV-SP240AT2-UL | RAV-SP300CT-UL / RAV-SP300AT2-UL | RAV-SP360CT-UL / RAV-SP360AT2-UL | RAV-SP420CT-UL / RAV-SP420AT2-UL |
|---|---|---|---|---|---|---|
| Cooling Rated Capacity BTUH | | 17,000 | 23,600 | 30,000 | 36,000 | 41,000 |
| SEER | | 17.0 | 19.5 | 20.6 | 20.4 | 18.8 |
| EER | | 8.6 | 9.0 | 13.0 | 12.0 | 9.7 |
| Heating Rated Capacity BTUH | | 19,000 | 28,800 | 29,800 | 38,000 | 44,500 |
| HSPF | | **10.8** | **10.3** | **8.5** | **11.0** | **11.0** |

## High Wall

| Product Model / Item | FCU / CDU | RAV-SP180KRT-UL / RAV-SP180AT2-UL | RAV-SP240KRT-UL / RAV-SP240AT2-UL |
|---|---|---|---|
| Cooling Rated Capacity BTUH | | 18,000 | 25,000 |
| SEER | | 19.5 | 16.7 |
| EER | | 10.0 | 9.1 |
| Heating Rated Capacity BTUH | | 19,000 | 26,400 |
| HSPF | | **11.5** | **9.8** |

# Operating envelope

| Product Model / Item | | FCU | RAV-SP180UT-UL | RAV-SP240UT-UL | RAV-SP300UT-UL | RAV-SP360UT-UL | RAV-SP420UT-UL |
|---|---|---|---|---|---|---|---|
| | | CDU | RAV-SP180AT2-UL | RAV-SP240AT2-UL | RAV-SP300AT2-UL | RAV-SP360AT2-UL | RAV-SP420AT2-UL |
| OD Min -Max DB* °F | Cooling | | 23 - 110 | | | | |
| ID Min - Max DB* °F | | | 70 - 90 | | | | |
| ID Min - Max WB* °F | | | 59 - 75 | | | | |
| OD Min -Max WB* °F | Heating | | -4 - 59 | | | | |
| ID Min - Max DB* °F | | | 59 - 86 | | | | |

*** Minimum Outdoor DB in Cooling is 5°F if a wind baffle is used**

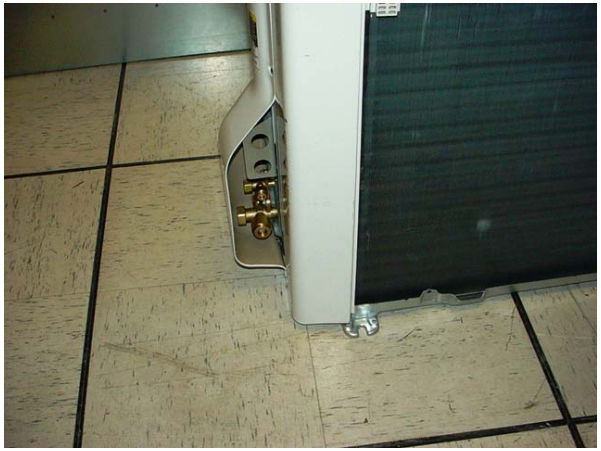
# Electrical data

| Product Model / Item | | FCU | RAV-SP180UT-UL | RAV-SP240UT-UL | RAV-SP300UT-UL | RAV-SP360UT-UL | RAV-SP420UT-UL |
|---|---|---|---|---|---|---|---|
| | | CDU | RAV-SP180AT2-UL | RAV-SP240AT2-UL | RAV-SP300AT2-UL | RAV-SP360AT2-UL | RAV-SP420AT2-UL |
| Voltage | | | 208-230/1/60 | | | | |
| MCA | | | 17 | 24 | | | |
| Fuse / Circuit Breaker of main power supply | | | 30 | 40 | | | |
| Power Supply Connection. | Connect to FCU/CDU | | CDU | | | | |
| | No. of Core | | 3 ( L1 , L2 , ) | | | | |
| Inter connecting wire betwee | No. of Core | | 4 ( L1 , L2 , S , ) | | | | |
| FCU & CDU (Not provide) | Size | | 14 AWG Minimum | | | | |
| Conduit size | | | 12.7 mm. or 1/2 inch | | | | |

## Piping Data

| Product Model / Item | FCU | RAV-SP180UT-UL | RAV-SP240UT-UL | RAV-SP300UT-UL | RAV-SP360UT-UL | RAV-SP420UT-UL |
|---|---|---|---|---|---|---|
| | CDU | RAV-SP180AT2-UL | RAV-SP240AT2-UL | RAV-SP300AT2-UL | RAV-SP360AT2-UL | RAV-SP420AT2-UL |
| Standard Piping Length ft. | | 25 | | | | |
| Minimum Piping Length ft. | | 16 | | 10 | | |
| Maximum Piping length ft. | | 165 | | 246 | | |
| Max. Piping w/o Charge ft. | | 65 | 100 | | | |
| Additional Charge oz/ft | | 0.22 | 0.43 | | | |
| Gas Pipe Size in. | | 1/2 | 5/8 | | | |
| Liquid Pipe Size in. | | 1/4 | 3/8 | | | |

# Service valves



Size 180

Sizes 240 - 420

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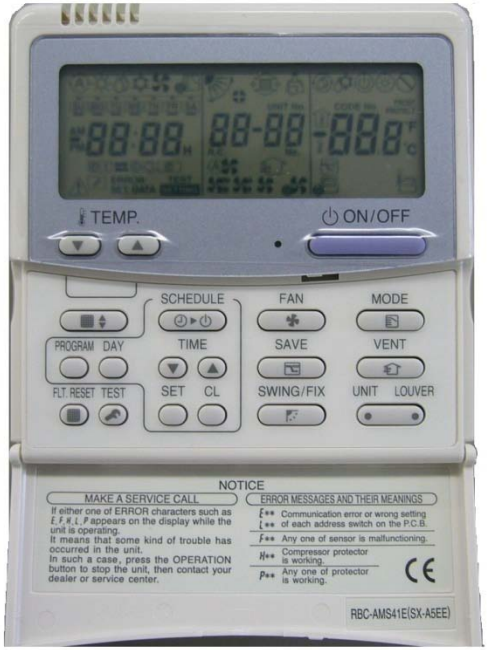
# WIRED controller with schedule timer




## CONNECTABLE UNITS

**for indoor units**

**SDI**

→ It can not be connected with “RAS” model .

## MODEL NAME

**RBC-AMS41UL**

## FEATURES

**1:Clock display**

**2:Weekly timer,**

**possible to program weekly schedule**

**possible to program 8 actions**

**for each day of the week**

***The following items can be set in program,**

**Operation time**

**Operation start/stop**

**Operation mode**

**Temperature setting**

**Restriction on button operation**



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## Wireless remote controllers

| | 4way cassette | Ceiling | High wall | Standalone |
|---|---|---|---|---|
| | **RBC-AC31U(W)-UL** | **RBC-AX22CUL** | **---** | **TCB-AX21UL** |
| Kit | | | (included in indoor unit) | |
| Appearance | | | **---** | **---** |

# Controller features – wired and wireless

| | Wired Remo | Wireless Remote Controller | | |
|---|---|---|---|---|
| | | | | |
| Model Name | RBC-AMT32UL<br>RBC-AMS41UL | RBC-AX31U(W/WS)-UL | RBC-AX22CUL | TCB-AX21UL |
| Start / Stop | ✓ | ✓ | ✓ | ✓ |
| Mode | ✓ | ✓ | ✓ | ✓ |
| Setting Temperature | ✓ | ✓ | ✓ | ✓ |
| Fan Speed | ✓ | ✓ | ✓ | ✓ |
| Timer Function | ✓ | ✓ | ✓ | ✓ |
| Schedule Function | ✓(*1) | | | |
| Filter dirty indicator | ✓ | | | |
| Error Display | ✓ | ✓(*2) | ✓(*2) | ✓(*2) |

# Room Temperature Control

## Cassette & Under ceilings

| | COOL/DRY | HEAT | AUTO |
|---|---|---|---|
| Wired type | 64°F [18°C] to 84°F [29°C] | 64°F [18°C] to 84°F [29°C] | 64°F [18°C] to 84°F [29°C] |
| Wireless type | 64°F [18°C] to 86°F [30°C] | 61°F [16°C] to 86°F [30°C] | 63°F [17°C] to 80°F [27°C] |

## Hi- Walls

| | COOL/DRY | HEAT | AUTO |
|---|---|---|---|
| Wired type * | 64°F [18°C] to 84°F [29°C] | | |
| Wireless type | 62°F [17°C] to 86°F [30°C] | | |

When using a wired remote control, sensing can be done at the wired control by setting DN32.

If the Ta (room temperature sensed at the units) is > 95°F (35°C) when the unit is running in Heat or Auto, the compressor will be de-energized.

## Bias Shift

| SET DATA | 0 | 2 | 4 | 6 |
|---|---|---|---|---|
| Setup temp. correction | +0°F (+0°C) | +3.6°F (+2°C) | +7.2°F (+4°C) | +10.8°F (+6°C) |

Units are set from the factory for a bias shift of 3.6 °F. This can be changed by DN 6.



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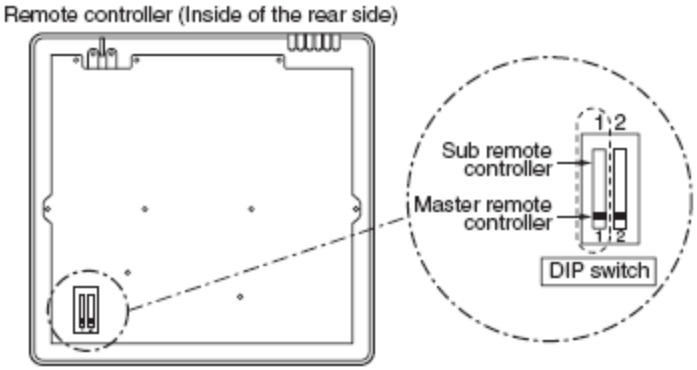
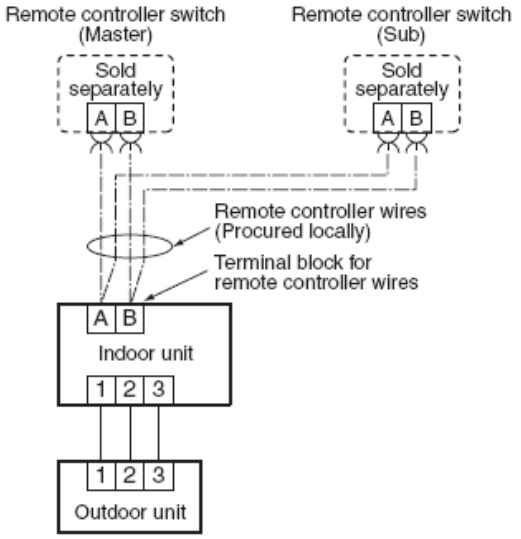
# Wiring and Setting of Wired Remote Control

The remote control can control one or multiple units
One unit or a group can be controlled by a maximum of 2 remotes

One of the remotes has to be set as a master and the other has to be set as a sub.

To set the wired remote as a master or sub, change the dip switches as shown below



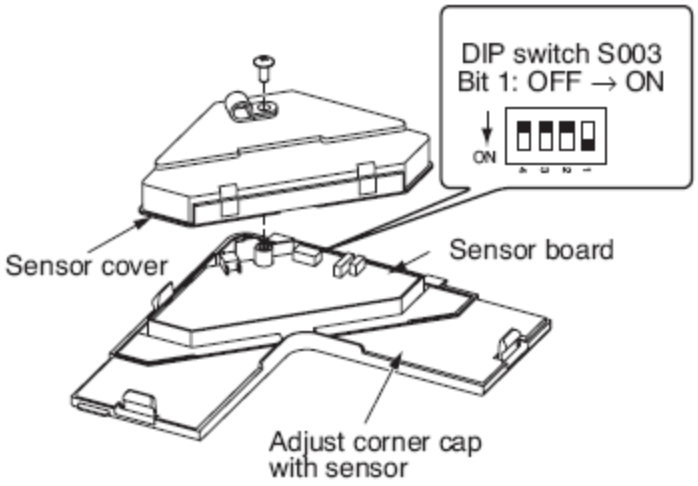




Operation

The operation can be changed by last push priority
Use the timer on either the Master or Sub remote control

# Setting of Wireless Remote Control as a Sub Remote

**<In case of 4-way Discharge Cassette Type>**

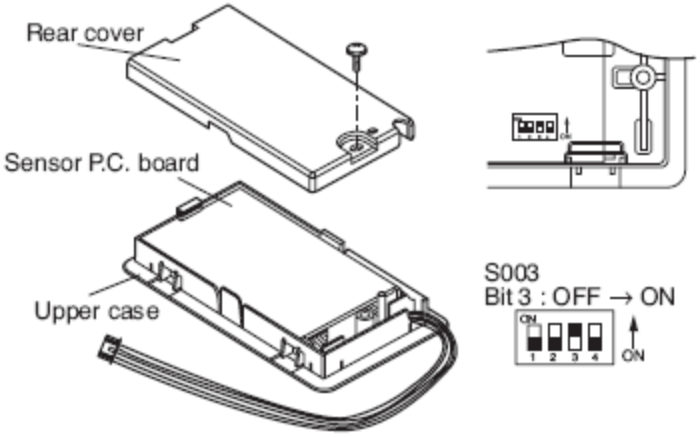


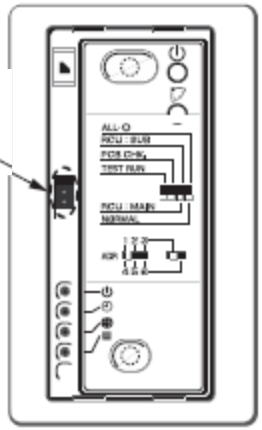

Replace OFF with ON of the Bit SW [Remote controller Master/Sub].

**<In case of Under Ceiling Type>**

**How to set wireless remote controller as sub remote controller**

Turn Bit [3: Remote controller Master/Sub] of the switch S003 from OFF to ON.




**<In case of Wireless remote controller kit>**



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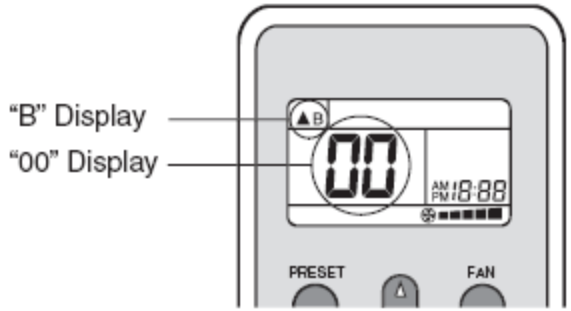
# High Wall – Wireless Remote Control A-B Selection

Use this functions when two units are installed in each others proximity and one remote could interfere with the operation of the second unit.

To set remote as a B (A is factory default) remote perform The following:

1. Turn the unit on by pushing On button on the indoor unit
1. Point wireless control towards the unit
2. Push the CHK button by the tip of a pencil. 00 will be shown on the display.
4. Push the MODE button while pushing the CHK button. B will be shown and 00 disappears.
5. Repeat above steps to set remote as A.



# Auto Restart

After a power failure, the Auto restart function reads the operation status from the EEPROM and then restarts the operation automatically

This function can be disabled by changing DN Code 28

| SET DATA | 0000 | 0001 |
|---|---|---|
| AUTO restart | None | Provided |

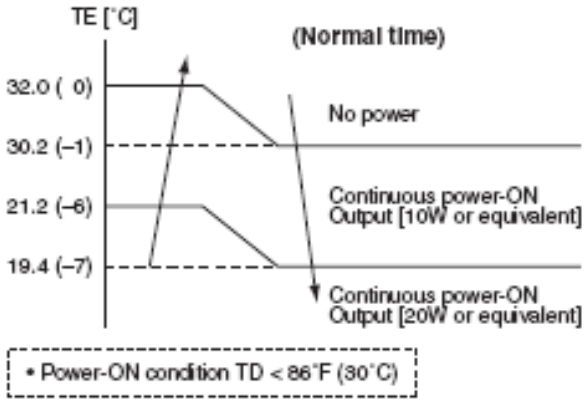
# Coil heating control (equivalent to crankcase heater) –RAV-SP180AT2-UL

The unit is not equipped with a crankcase heater.

To prevent liquid refrigerant in compressor, power is turned on and compressor rotates at low frequencies to generate heat

This function is controlled by TE and TD as shown in graph

Power is turned off is TD ≥ 86°F (30°C )



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# Coil heating control (equivalent to crankcase heater) –RAV-SP240-420AT2-UL

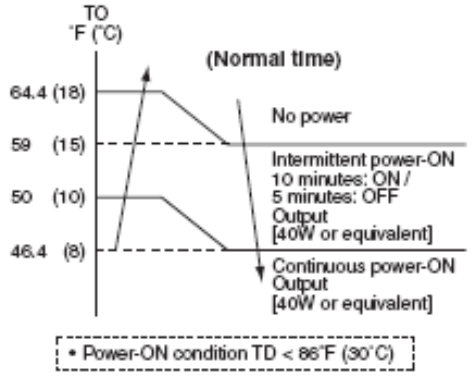
The unit is not equipped with a crankcase heater.

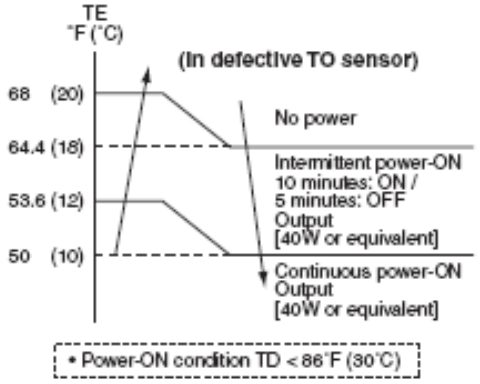
To prevent liquid refrigerant in compressor, power is turned on and compressor rotates at low frequencies to generate heat

This function is controlled by TO and TD as shown in graph

If TO sensor is defective , a backup control is automatically performed by TE sensor.

Power is turned off is TD ≥ 86°F (30°C )



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# Filter Display - Wired and TCB-AX21UL Wireless Control

The operating time of the fan is logged

When the default time for filter cleaning (2500 hours) is reached, filter reset icon is displayed on the LCD

Clear the filter reset icon by the remote control after cleaning the filter

The timer is reset

The default value can be changed by resetting DN Code

# Energy Saving Control

This mode is available if unit is set to AUTO mode

Ta (room temperature), To (outside temperature), CFM, and Tc (heat exchanger sensor) are monitored for 20 minutes

Based on the above data, the set point is shifted every 20 minutes without losing any comfort

The set point is corrected in the following range:

In cooling: 1.5° to – 1°

In heating: - 1.5° to + 1°

# Save Operation – Wired Control Only

This feature saves energy by limiting the allowable compressor frequency

1. Push the SAVE button on the remote control, The SAVE is displayed on LCD
2. This mode is stored in the EEPROM and the unit will restart in the save mode unless the mode is changed or power is reset.
3. During the operation, the current release control is performed per the restriction value (75% set from the factory) set in EEPROM of the outdoor unit.
4. Restriction value can be changed as follows:
   While the unit is off push the SAVE button for 4 seconds or more
   The DN Code C2 and the restriction value will be displayed
   Each push of the UP or DOWN TIME buttons will change the setting by 1%. Setting can be between 50 and 100%
   Push SET to confirm the setting
   Push TEST to go back to normal operation

# Self-Cleaning Operation – Cassettes Only (Wired Control)

Self-Cleaning function is performed per the table below after the unit stops and if it was operating in AUTO COOL, COOL, and DRY modes.

| Compressor ON period | Self-clean operation period | FAN | Drain pump | Louver |
|---|---|---|---|---|
| 0 to 10 min. | None | Fan (UL) | STOP | Horizontal discharge position |
| 10 to 60 min. | 1 hour | | | |
| 60 min. to | 2 hours | | | |

During self –clean operation, the operation light (green) is off but self –clean icon is displayed on remote.

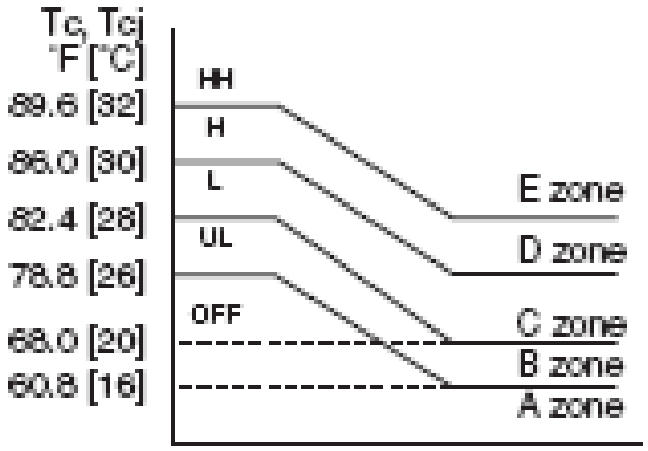
Self-clean operation can be stopped if the ON/OFF button on the remote control is pushed twice.

If self-clean function is not required it can be deactivated by setting DN Code D3 to [0000]

If the self-clean icon is not required, it can be deactivated by setting DN Code D4 to [0001]

# Cool Air Discharge Prevention Control

In heating operation, the upper limit of the fan speed is controlled by the Tc and Tcj sensor as shown below




In zones E and D priority is given to the remote control selection

For up to 6 minutes after the compressor is energized, zone B is assumed zone C to prevent "I do not feel warm" complaints

In defrost operation, the value of Tc is shifted by 42.8°F

# Hi Power Operation – High Walls (Wireless Remote Only)

When Hi Power is pushed during COOL, HEAT or AUTO, the following will happen:

Cooling Operation

Set point will be lowered by 1.8°F (1°C)
Fan speed will be increased only if the fan is running at less than high speed

Heating Operation

Set point will be raised by 3.6°F (2°C)
Fan speed will be increased only if the fan is running at less than high speed

# Comfort Sleep – High Wall (Wireless Control Only)

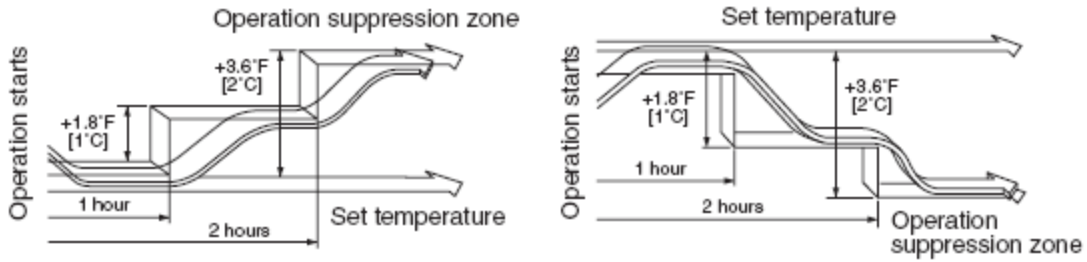
Push the Comfort Sleep button during  COOL, HEAT, or AUTO modes

The Comfort Sleep Icon will be displayed on remote

Push the Comfort Sleep button again to set the off timer (1,3,5, or 9 hours)

Auto fan will be displayed and fan will run on low

The following happens in the COOL or HEAT modes:



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# OPERATION CONTENT

High Wall DN Codes

Cassette and Under Ceiling DN Codes

Cooling operation

Heating operation

Pulse Modulating Valve (PMV) control

Automatic Capacity Control

Auto Mode

DC Motor

Indoor Fan Speed Control

Outdoor fan control - Cooling RAV180AT2-UL

Outdoor fan control - Cooling RAV180AT2-UL

Outdoor fan control - Cooling RAV-S_240 -420AT2-UL

Outdoor fan control - Cooling RAV180AT2-UL

Outdoor fan control - Heating all sizes

Defrost Control – RAV-SP180AT2-UL

Defrost Control – other sizes

Drain Pump Control – Cassette and Under Ceiling

# High Wall DN Codes

## Indoor unit capacity (CODE No. [11])

| SET DATA | Model |
|---|---|
| 0001* | Invalid |
| 0009 | RAV-SP180KRT-UL |
| 0012 | RAV-SP240KRT-UL |

| DN | Item | Memo | At shipment | |
|---|---|---|---|---|
| 01 | Filter sign lighting time | | 0001: 150 hour | |
| 02 | Dirty state of filter | | 0000: Standard | |
| 03 | Central control address | | 0099: Unfixed | |
| 06 | Heating suction temp shift | | 0002: +3.6°F (+2°C) | |
| 0C | PRE-DEF indication selection | | 0000: Standard | |
| 0d | Cooling auto mode existence | | 0001: No auto mode cooling/heating | Automatic selection by connected outdoor unit |
| 0F | Cooling only | | 0000: Heat pump | |
| 10 | Type | Be sure to set as 0008 | 0008: High wall type | |
| 11 | Indoor unit capacity (See below table) | | According to capacity type | |
| 12 | Refrigerant line address | | 0099: Unfixed | |
| 13 | Indoor unit address | | 0099: Unfixed | |
| 14 | Group address | | 0099: Unfixed | |
| 1E | Temp difference of automatic cooling/ heating selecting control points | | 0003: 3deg (Ts ± 1.5) | |
| 28 | Auto restart | | 0001: Provided | |
| 2A | Option input selection (CN80) | | 0002: External emergency input | |
| 2b | Thermo output selection (T10 ③) | | 0000: Thermo ON | |
| 2E | Input selection (T10 ①) | | 0000: Operation input | |
| 32 | Sensor selection | | 0000: Available | |
| 60 | Timer set (Wired remote controller) | | 0000: Available | |
| 69 | Louver selection of cooling | | 0000: Standard | |

# Cassette and Under Ceiling DN Codes

Table 2. Type: CODE No. 10

| SET DATA | Type | Type name abb. |
|---|---|---|
| 0001*1 | 4-way Air Discharge Cassette Type | RAV-SP∗∗∗UT-UL |
| 0007 | Under Ceiling Type | RAV-SP∗∗∗CT-UL |

Table 3.
Indoor unit capacity: CODE No. 11

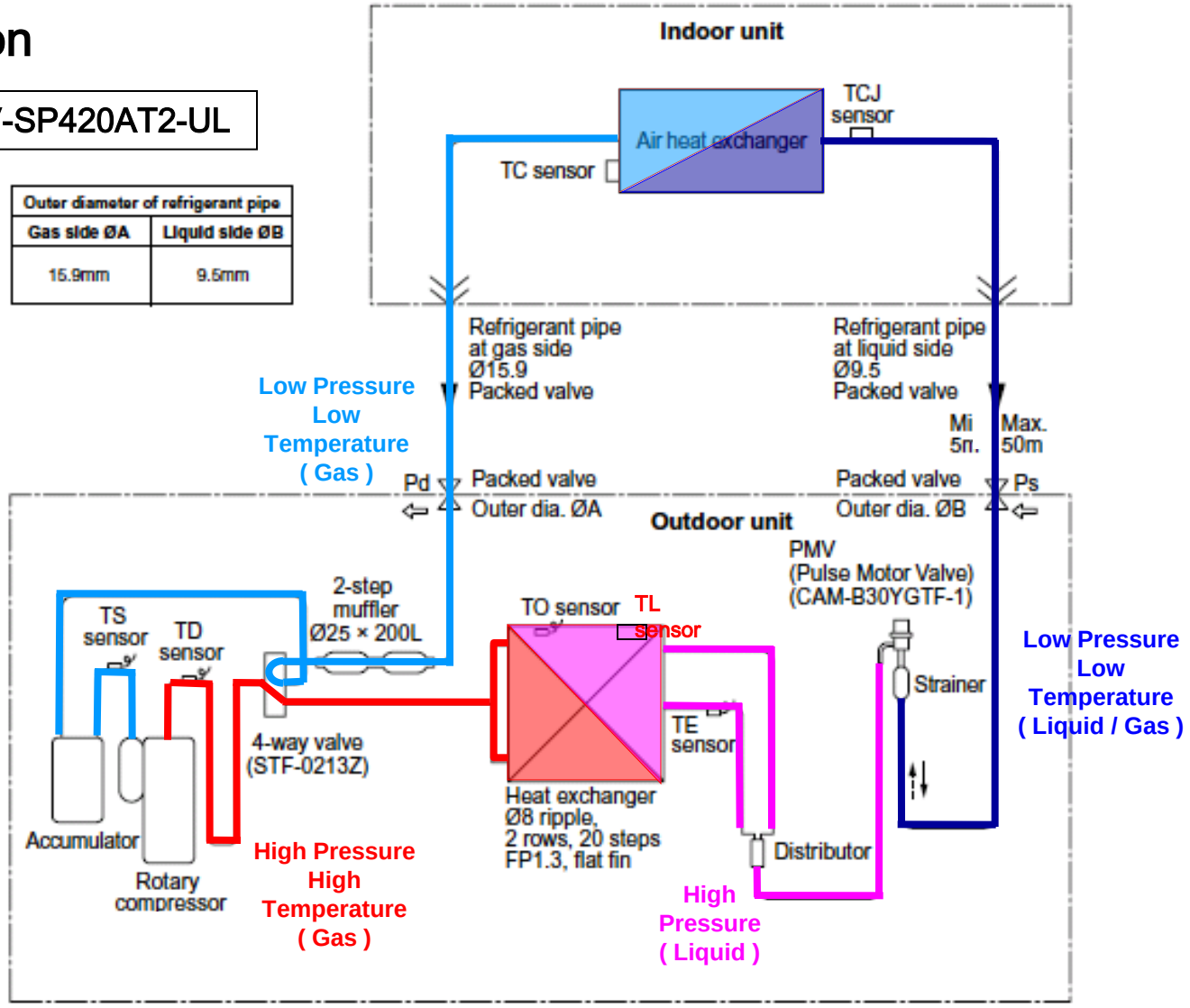
| SET DATA | Type |
|---|---|
| 0000∗ | Disable |
| 0009 | 180 |
| 0012 | 240 |
| 0015 | 300 |
| 0017 | 360, 420 |

| CODE No. (DN) | Item | Contents | At shipment from factory |
|---|---|---|---|
| 01 | Filter sign lighting time | 0000: None 0001: 150H<br>0002: 2500H 0003: 5000H<br>0004: 10000H 0005: Clogging sensor used | According to type |
| 02 | Filter stain level | 0000: Standard<br>0001: Heavy stain (Half of standard time) | 0000: Standard |
| 03 | Central control address | 0001: No.1 unit to 0064: No.64 unit<br>0099: Undecided | 0099: Undecided |
| 06 | Heating suction temp. shift | 0000: No shift 0001: 1.8°F [+1°C]<br>0002: 3.6°F [+2°C] to 0010: 18°F [+10°C]<br>(Up to +6 is recommended.) | 0002: 3.6°F [+2°C] |
| 0F | Cooling-only | 0000: Heat pump<br>0001: Cooling only (No display for [AUTO] [HEAT] ) | 0000: Heat pump |
| 10 | Type | 0001: (4-way air discharge cassette)<br>0007: (Under ceiling) | According to model type |
| 11 | Indoor unit capacity | 0000: Undecided 0001 to 0034 | According to capacity type |
| 12 | Line address | 0001: No.1 unit to 0030: No.30 unit | 0099: Undecided |
| 13 | Indoor unit address | 0001: No.1 unit to 0064: No.64 unit | 0099: Undecided |
| 14 | Group address | 0000: Individual 0001: Header unit in group<br>0002: Follower unit in group | 0099: Undecided |
| 19 | Louver type<br>(Adjustment of air direction) | 0000: No louver model 0001: Swing only<br>(0002:1-way) (0003: 2-way)<br>0004: 4-way | According to model type |
| 1E | In automatic cooling/heating, temp. width of cool → heat, heat → cool mode selection control point | 0000: 0 deg to 0010: 10 deg<br>(Cool/heat are reversed with ± (Data value) / 2 against the set temperature) | 0003: 3 deg<br>(Ts±1.5) |
| 28 | Auto restart | 0000: None 0001: Provided | 0001: Provided |
| 2A | Selection of option / error input<br>(CN70) | 0000: Filter input 0001: Alarm input<br>0002: Humidifier input (Air cleaner, etc.) | 0002: Humidifier |
| 2b | Selection of thermostat output<br>(T10 ③ ) | 0000: Indoor thermostat ON<br>0001: ON receiving output of outdoor compressor | 0000: Thermostat ON |
| 2E | Selection of HA (T10) terminal | 0000: Normal (JEMA) 0001: Card input<br>0002: Fire alarm input (Forgotten to be off) | 0000: Normal<br>(HA terminal) |
| 31 | Fan (Single operation) | 0000: Impossible 0001: Possible | 0000: Impossible |
| 32 | Sensor selection | 0000: Body TA sensor<br>0001: Remote controller sensor | 0000: Body sensor |
| 33 | Temperature display SW | 0000: °C 0001: °F | 0001: °F |
| 5d | High ceiling selection<br>(Air volume selection) | 0000: Standard filter<br>0001: Super long life<br>0003: High performance (65%), High performance (90%),<br>(0006:Deodorant, Ammonia deodorization) | 0000: Standard |
| 60 | Timer setting<br>(Wired remote controller) | 0000: Operable 0001: Operation prohibited | 0000: Operable |

# Cooling operation

Example of RAV-SP420AT2-UL

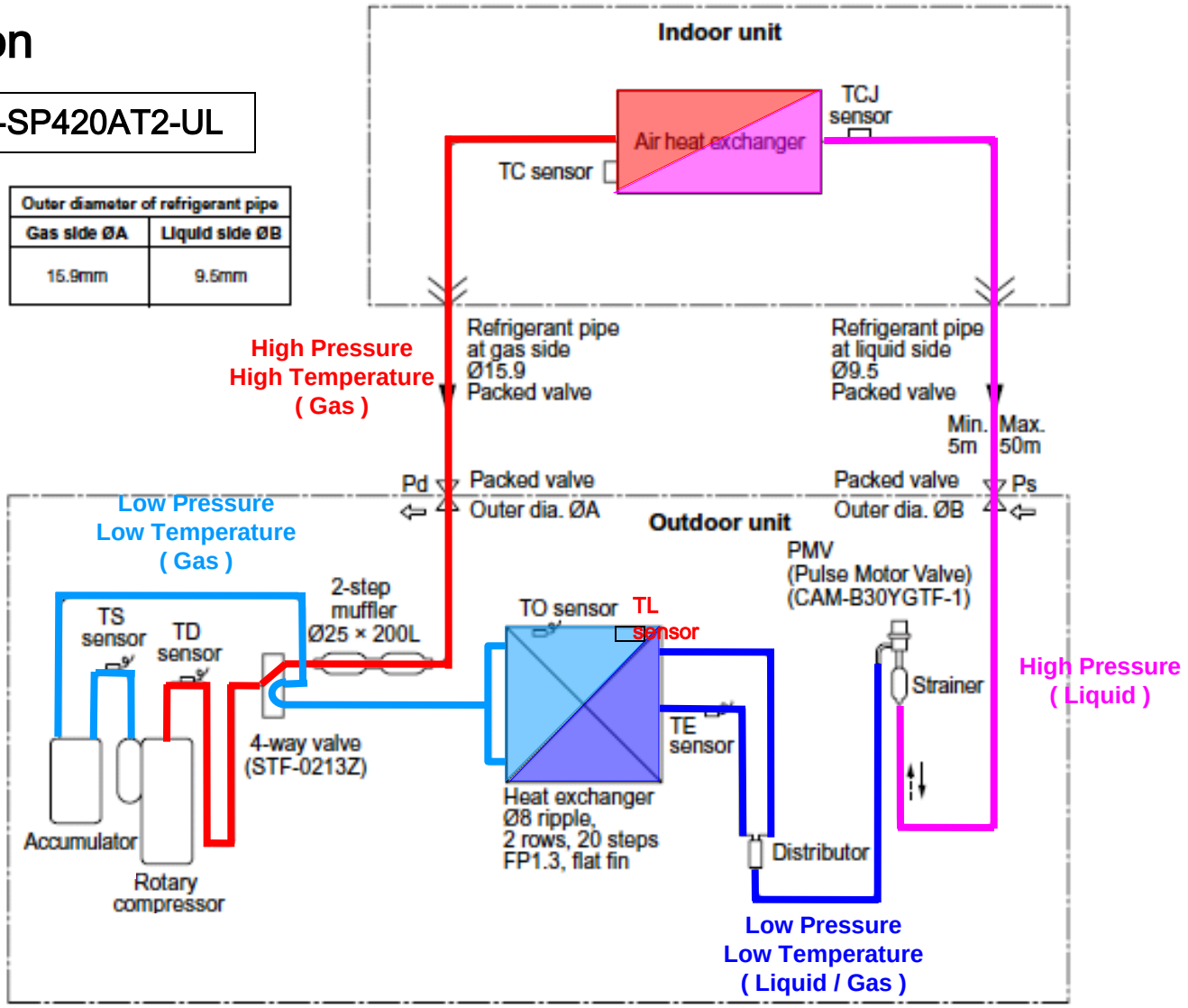
| Outer diameter of refrigerant pipe | |
|---|---|
| Gas side ØA | Liquid side ØB |
| 15.9mm | 9.5mm |



# Heating operation

Example of RAV-SP420AT2-UL

| Outer diameter of refrigerant pipe | |
|---|---|
| Gas side ØA | Liquid side ØB |
| 15.9mm | 9.5mm |



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# Pulse Modulating Valve (PMV) control.

1) PMV is controlled by magnetic coil and operates at between 30 to 500 pulses during operation.

2) In cooling operation, the PMV is controlled by the difference in temperature between the TS and TC sensor. (Target 1 to 4 °)

3) In heating operation, the PMV is controlled by the difference in temperature between the TS and TE sensor. (Target –1 to 4°)

4) The target value for compressor discharge temperature (TD) is usually 196°F (91℃) in cooling and 205°F (96℃) in heating . If TD exceeds 205°F (96℃) in either cooling or heating operations, the PMV is controlled by the TD sensor (Discharge temperature release control).

# Automatic Capacity Control

The compressor frequency is controlled by the difference between the Ta (room temperature) and Ts (set point temperature)

In COOL and DRY modes, the difference is calculated every 90seconds , and if need be, the compressor speed is corrected.

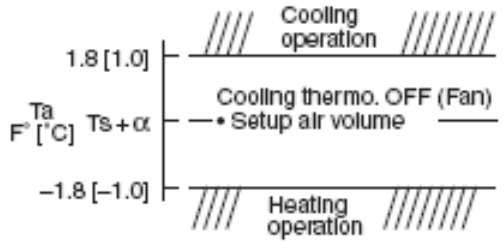
In DRY mode the maximum frequencies allowed are lower than those of the COOL mode.

In HEAT, the algorithm is same as cooling but correction is performed every 60 seconds.

# Auto Mode

Heat/Cool mode is determined by Ta (room temperature), Ts (set point temperature) and To (outside temperature)

For the first time only modes are determined as shown below:



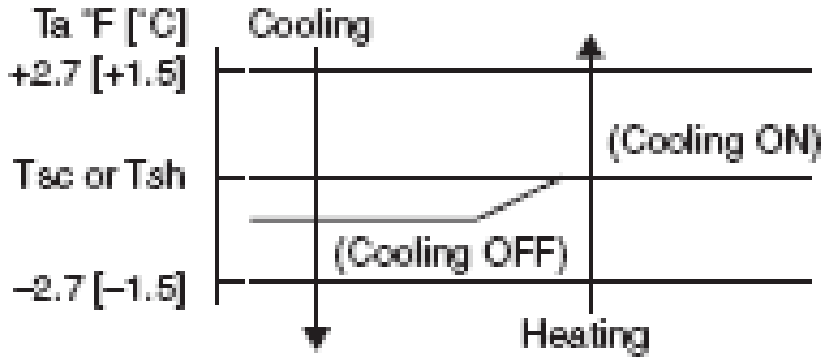

• α is corrected according to the outside temperature.

| Outside temp. | Correction value (α) |
|---|---|
| No To | 0K |
| To ≥ 75.2°F (24°C) | –1K |
| 75.2°F (24°C) > To ≥ 64.4°F (18°C) | 0K |
| To < 64.4°F (18°C) | +1K |
| To error | 0K |

K = degrees

# Auto Mode - Continued

After the first time, COOL/HEAT will be selected as shown below:




Tsc – Cooling set point

Tsh – Heating set point + bias correction

Unit will switch into COOL when Ta> Tsh + 2.7°F

Unit will switch into HEAT when Ta <Tsc - 2.7°F

Modes cannot be switched before 10 minutes elapse

# DC Motor

When the fan operation starts, positioning of the stator and rotor is performed.

A tap noise could be heard while the positioning is being performed.

After positioning the motor operates per the input form the indoor controller

If a lock is detected, the unit will stop and an error code will be displayed.

# Indoor Fan Speed Control

Fan speed can be controlled manually or AUTO

Manual speeds set by wired remote control are : HH, H and L

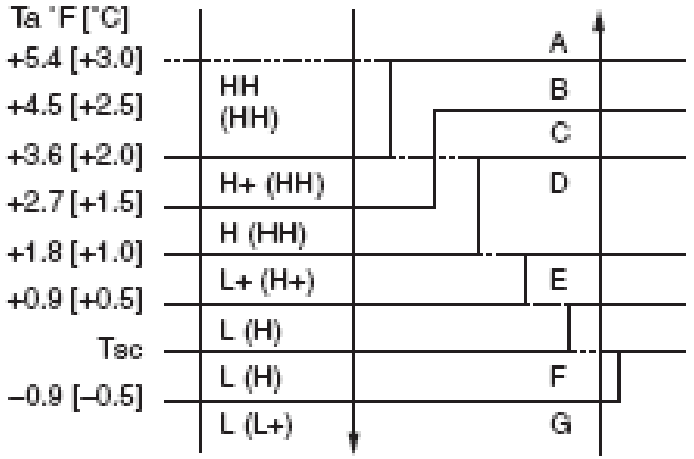
Manual speeds set by wireless remote control on Hi Wall are: HH, H+, H, L+, L

## Fan AUTO Operation - Cooling

The fan speed is a function of the difference between Ta and Tsc

Fan speed will be maintained for 3 min before it can change

Fan speeds indicated in ( ) are for AUTO COOL



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# Indoor Fan Speed Control - Continued

## Fan AUTO Operation - Heating

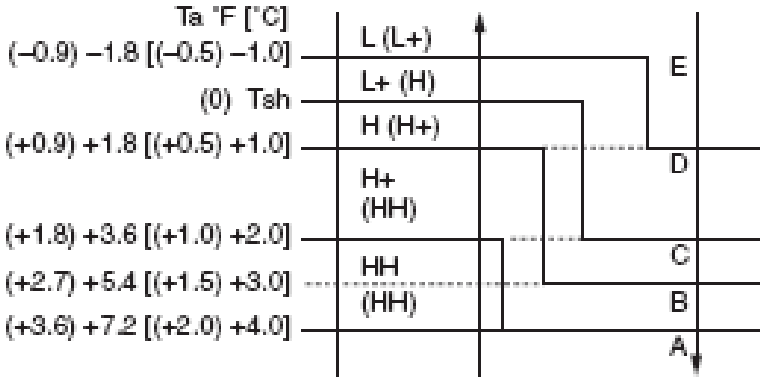
The fan speed is a function of the difference between Ta and Tsh

Fan speed will be maintained for 1 min before it can change

Values indicated in [ ] are for room temperatures sensed remotely

Fan speeds indicated in ( ) are for AUTO HEAT

If Tc ≥ 140°F (60°C) , the fan speed will increase by 1 step




In some cases, after the set point is satisfied, the fan will keep running for 3 min at L speed to remove any residual heat from the coil.

When set point is satisfied, the fan will continue running at UL. If coil temperature drops below 60.8°F(16°C) the fan will stop.

# Outdoor fan control - Cooling RAV180AT2-UL

**Outdoor fan is controlled by:**

- **TE Sensor – Coil temperature**
- **TO Sensor – Outdoor temperature**
- **Compressor frequency**

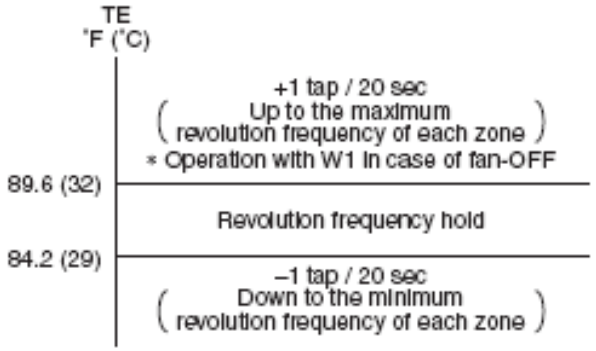
} Zone

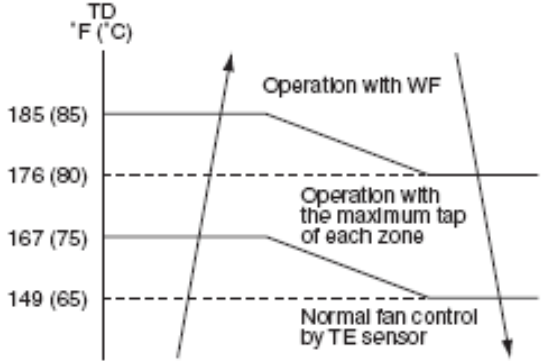
**For the first 60 sec. after startup the fan will run at maximum tap for the zone**

**After 60 sec. fan speed is controlled by TE**

**Outdoor fan motor has 15 taps**

**If TD (discharge temperature exceeds 167°F(75°C), the fan speed is controlled by TD**



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# Outdoor fan control - Cooling RAV180AT2-UL

## Motor Taps

Revolution frequency allocation of fan taps [rpm]

| RAV-SP | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | WA | WB | WC | WD | WE | WF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180AT2-UL | 200 | 250 | 300 | 400 | 480 | 500 | 520 | 560 | 640 | 670 | 700 | 750 | 800 | 880 | 980 |

## Zones

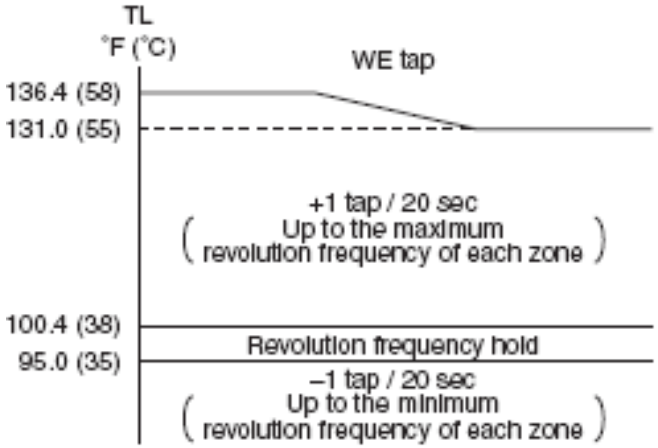
| Temp. range | 20 Hz or lower | | 20Hz to 45Hz | | 45Hz or higher | |
|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. |
| 100.4°F (38°C) ≤ TO | W6 | WB | W7 | WE | W9 | WF |
| 82.4°F (28°C) ≤ TO < 100.4°F (38°C) | W5 | WA | W6 | WD | W8 | WE |
| 59°F (15°C) ≤ TO < 82.4°F (28°C) | W3 | W7 | W4 | W9 | W6 | WB |
| 41.9°F (5.5°C) ≤ TO < 59°F (15°C) | W2 | W5 | W3 | W7 | W5 | W9 |
| 32°F (0°C) ≤ TO < 41.9°F (5.5°C) | W1 | W3 | W2 | W5 | W3 | W7 |
| 23°F (–5°C) ≤ TO < 32°F (0°C) | W1 | W2 | W1 | W3 | W2 | W4 |
| TO < 23°F (–5°C) | OFF | OFF | OFF | OFF | W1 | W3 |
| TO error | W1 | WB | W1 | WE | W1 | WF |

# Outdoor fan control - Cooling RAV-S_240 -420AT2-UL

**Outdoor fan is controlled by:**

- **TL Sensor – Coil temperature**
- **TO Sensor – Outdoor temperature**
- **Compressor frequency**

} Zone




**For the first 60 sec. after startup the fan will run at maximum tap for the zone**

**After 60 sec. fan speed is controlled by TL**

**Outdoor fan motor has 15 taps for size 240 and 14 taps for the other sizes**

## Motor Taps

Revolution frequency allocation of fan taps [rpm]

| RAV- | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | WA | WB | WC | WD | WE | WF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP240AT2-UL | 200 | 230 | 260 | 300 | 340 | 380 | 420 | 460 | 520 | 570 | 600 | 630 | 670 | 710 | 740 |

| RAV- | | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | WA | WB | WC | WD | WE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP300AT2-UL<br>SP360AT2-UL<br>SP420AT2-UL | Up | 200 | 240 | 240 | 260 | 320 | 380 | 480 | 500 | 530 | 610 | 640 | 660 | 720 | 780 |
| | Down | — | — | 200 | 280 | 360 | 400 | 500 | 520 | 550 | 630 | 660 | 700 | 740 | 820 |



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# Outdoor fan control - Cooling RAV180AT2-UL

## Zones

<RAV-SP240AT2-UL>

| Temp. range | 20 Hz or lower | | 20Hz to 45Hz | | 45Hz or higher | |
|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. |
| 100.4°F (38°C) ≤ TO | W6 | WC | W8 | WE | WA | WE |
| 84.2°F (29°C) ≤ TO < 100.4°F (38°C) | W5 | WB | W7 | WD | W9 | WD |
| 59°F (15°C) ≤ TO < 84.2°F (29°C) | W4 | W8 | W6 | WA | W8 | WC |
| 41°F (5°C) ≤ TO < 59°F (15°C) | W3 | W6 | W5 | W8 | W7 | WA |
| 32°F (0°C) ≤ TO < 41°F (5°C) | W2 | W4 | W4 | W6 | W5 | W8 |
| 24.8°F (–4°C) ≤ TO < 32°F (0°C) | W2 | W3 | W3 | W5 | W4 | W6 |
| TO < 24.8°F (–4°C) | OFF | OFF | OFF | W2 | OFF | W3 |
| TO error | OFF | WC | OFF | WE | OFF | WE |

<RAV-SP300AT2-UL, RAV-SP360AT2-UL, RAV-SP420AT2-UL>

| Temp. range | 20 Hz or lower | | 20Hz to 45Hz | | 45Hz or higher | |
|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. |
| 100.4°F (38°C) ≤ TO | W6 | WC | W8 | WC | WA | WE |
| 84.2°F (29°C) ≤ TO < 100.4°F (38°C) | W5 | WB | W7 | WC* | W9 | WC |
| 59°F (15°C) ≤ TO < 84.2°F (29°C) | W4 | W8 | W6 | WA | W8 | WC |
| 41°F (5°C) ≤ TO < 59°F (15°C) | W3 | W6 | W5 | W8 | W7 | WA |
| 32°F (0°C) ≤ TO < 41°F (5°C) | W2 | W4 | W4 | W6 | W5 | W8 |
| 24.8°F (–4°C) ≤ TO < 32°F (0°C) | W2 | W3 | W3 | W5 | W4 | W6 |
| TO < 24.8°F (–4°C) | W1 | W2 | W1 | W4 | W2 | W6 |
| TO error | W1 | WC | W1 | WC | W2 | WD |

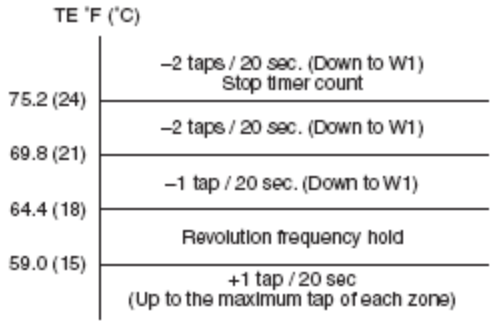
# Outdoor fan control - Heating all sizes

The outdoor fan is controlled by:

TE – Coil temperature

TO – Outdoor temperature

Compressor frequency


TE °F (°C)
75.2 (24)
69.8 (21)
64.4 (18)
59.0 (15)
–2 taps / 20 sec. (Down to W1)
Stop timer count
–2 taps / 20 sec. (Down to W1)
–1 tap / 20 sec. (Down to W1)
Revolution frequency hold
+1 tap / 20 sec
(Up to the maximum tap of each zone)

For 3 minutes after startup, the fan will run using at the max tap for the zone

After 3 minutes, the fan is controlled by TE

When TE≥ 75.2°F (24°C) continues for 5 minutes, the compressor stops.

Compressor restarts after 2 min, 30 sec.

If this happens frequently clean filter.

| Temp. range | 20 Hz or lower | 20Hz to 45Hz | 45Hz or higher |
|---|---|---|---|
| | Max. | Max. | Max. |
| 50°F (10°C) ≤ TO | W7 | W8 | W9 |
| 41.9°F (5.5°C) ≤ TO < 50°F (10°C) | WA | WC | WE |
| 23°F (–5°C) ≤ TO < 41.9°F (5.5°C) | WD | WE | WF |
| TO < 23°F (–5°C) | WE | WF | WF |
| TO error | WE | WF | WF |



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# Defrost Control – RAV-SP180AT2-UL

Defrost is initiated if TE sensor satisfies any condition in zones A,B,C, or D

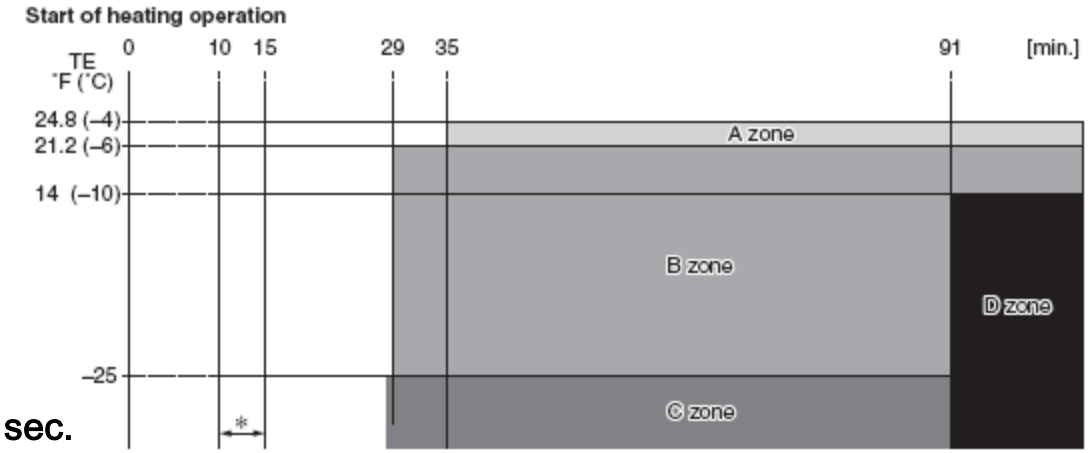
Defrost cycle ends if:

- TE sensor ≥53.6°F (12°C)
- 41°F(5°F)≤TE< 53.6°F (2°C) >80 sec.
- Defrost operation ran for 15 min

Defrost operation is reset

Compressor is reenergized for 40 sec.

Heating operation starts




* The minimum TE value and To value between 10 and 15 minutes after heating operation has started are stored in memory as TE0 and To0, respectively.

| | In normal To | In abnormal To |
|---|---|---|
| A zone | When status (TE0 – TE) – (To0 – To) ≥ 37.4°F (3°C) continued for 20 seconds | When status (TE0 – TE) ≥ 37.4°F (3°C) continued for 20 seconds |
| B zone | When status (TE0 – TE) – (To0 – To) ≥ 36.5°F (2.5°C) continued for 20 seconds | When status (TE0 – TE) 36.5°F (2.5°C) continued for 20 seconds |
| C zone | When the status (TE ≤ –14.8°F (–26°C)) continued for 20 seconds | |
| D zone | When the status (TE ≤ 14°F (–10°C)) continued for 20 seconds | |



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# Defrost Control – other sizes

Defrost is initiated if TE sensor satisfies any condition in zones A,B,C, or D

Defrost cycle ends if:

TE sensor ≥53.6°F (12°C) for 3 sec.

44.6°F(7°C)≤TE< 53.6°F (12°C) > 1 min.

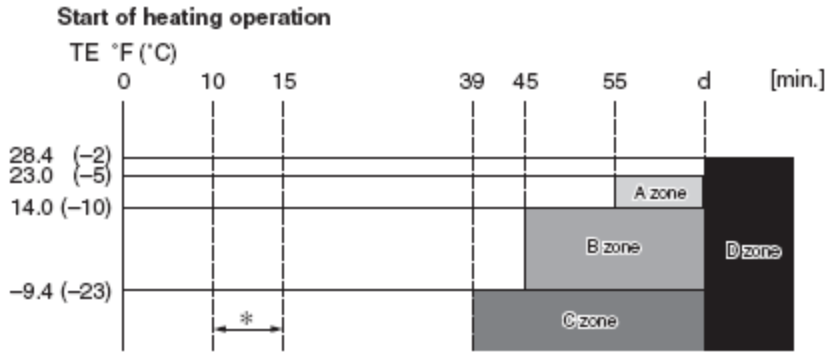
Defrost operation ran for 10 min

Defrost operation is reset

Compressor is reenergized for 40 sec.

Heating operation starts

d time can be changed by modifying jumper's J805 and J806 as shown in the table on right




* The minimum TE value and To value between 10 and 15 minutes after heating operation has started are stored in memory as TE0 and To0, respectively.

| | In normal To | In abnormal To |
|---|---|---|
| A zone | When status (TE0 – TE) – (To0 – To) ≥ 37.4°F (3°C) continued for 20 seconds | When status (TE0 – TE) ≥ 37.4°F (3°C) continued for 20 seconds |
| B zone | When status (TE0 – TE) – (To0 – To) ≥ 35.6°F (2°C) continued for 20 seconds | When status (TE0 – TE) ≥ 35.6°F (2°C) continued for 20 seconds |
| C zone | When status (TE ≤ –9.4°F (–23°C)) continued for 20 seconds | |
| D zone | When compressor operation status of TE < 28.4°F (–2°C) is calculated by d portion | |

| J805 | J806 | d |
|---|---|---|
| ○ | ○ | 150 minutes Setting at shipment |
| ○ | × | 90 minutes |
| × | ○ | 60 minutes |
| × | × | 30 minutes |

○ : Short circuit, × : Open



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# Drain Pump Control – Cassette and Under Ceiling

In COOL and DRY mode the drain pump is energized when compressor is energized.

If the float switch is activated while the pump is running, the compressor is de energized and a check code is displayed.

If the float switch is activated before the pump starts, the pump is energized. If the float switch is activated for more than 4 minutes, a check code is displayed.

# SAFETIES CONTENT

Short intermittent operation preventive control – all sizes

Current release value shift control

Over-current protection control – all sizes

Discharge temperature release control

High-pressure SW control

Freeze Protection

High-Temperature Release Control

# Short intermittent operation preventive control – all sizes

If the set point is satisfied, and in order to protect the compressor, the compressor will not shut off if it ran less than 3 to 10 minutes.

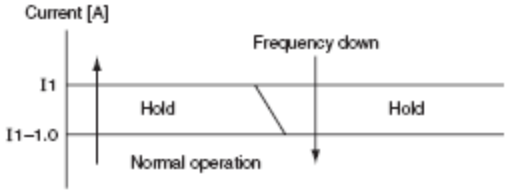
If the unit is shut off with the wired or wireless control , the compressor will shut off immediately.

# Current release control

In order not to damage the inverter, maximum currents allowed are shown in the tables on the right.

These values are applicable for outdoor temperatures less than 102.2°F (39°C)

This is controlled by the outdoor P.C. board




| Model | RAV-SP180AT2-UL | |
|---|---|---|
| | COOL | HEAT |
| I1 value [A] | 10.80 | 13.05 |

| Objective model RAV- | SP240AT2-UL | | SP300AT2-UL SP360AT2-UL SP420AT2-UL | |
|---|---|---|---|---|
| | COOL | HEAT | COOL | HEAT |
| I1 value [A] | 16.0 | 20.0 | 20.0 | 20.0 |



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# Current release value shift control

A shift in the value of the current release occurs when the outdoor temperature is ≥ 102.2°F (39°C) or the outdoor air sensor (TO) fails

This occurs to prevent troubles of the electronic parts and the compressor itself during cooling operations.

The new values are shown in the table on the right.

Current release control value (I1)

[A]

| Temperature range | RAV-SP180AT2-UL |
|---|---|
| 122°F (50°C) ≤ TO | 5.1 |
| 113°F (45°C) ≤ TO < 122°F (50°C) | 5.1 |
| 102.2°F (39°C) ≤ TO < 113°F (45°C) | 7.6 |
| TO < 102.2°F (39°C) | 10.6 |
| TO error | 5.1 |

[A]

| Temperature range | RAV-SP300AT2-UL<br>RAV-SP360AT2-UL<br>RAV-SP420AT2-UL |
|---|---|
| 111.2°F (44°C) ≤ To | 15.0 |
| 102.2°F (39°C) ≤ To < 111.2°F (44°C) | 17.7 |
| To < 102.2°F (39°C) | 20.0 |
| TO error | 15.0 |

# Over-current protection control – all sizes

When an abnormal current is detected, the safety circuit stops the compressor.

The compressor restarts after 2 minutes 30 seconds

Error count is set  to 1

When the error count is up to 8, the compressor will not restart

An error code will be displayed

# Discharge temperature release control

If discharge temperature reaches abnormal stop, the compressor will shut off.

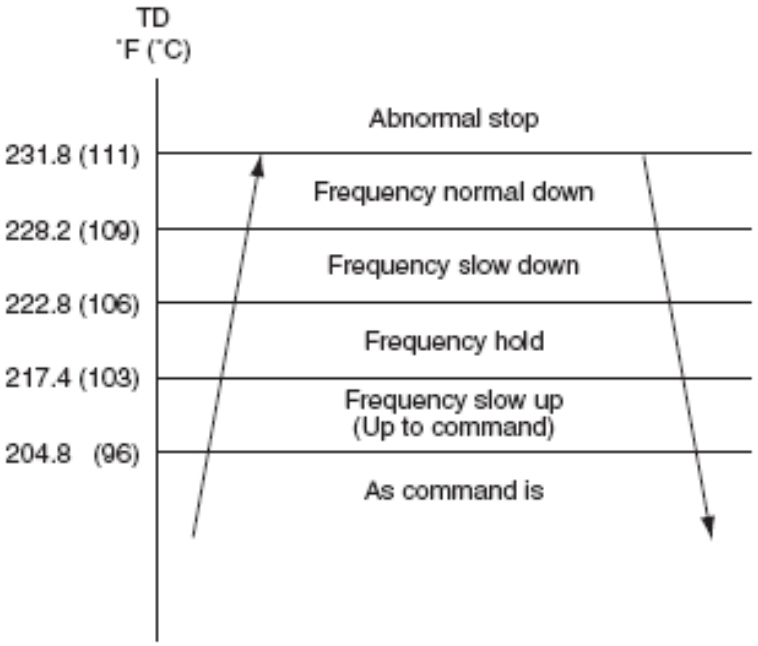
After 2 min. 30 sec. compressor will restart.

If compressor runs for 10 min or more, error is cleared.

If error is detected 4 times, system will stop

Possible causes:

- Low charge
- PMV error
- Blockage in system



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# High-pressure SW control

The units are equipped with a pressure switch

When the “STOP pressure” is detected, the compressor stops.

Error count is 1.

Compressor restarts when the “Reset pressure” is reached and 5 minutes elapsed.

If the compressor runs for 10 minutes, the error is cleared.

If the error count reaches 10, the compressor will not restart.

An error message will be displayed.

Pressure of High-pressure switch control

| | |
|---|---|
| STOP pressure | 601.8 $^{+0}_{-29}$ psi ( 4.15 $^{+0}_{-0.2}$ MPa ) |
| RESET pressure | 464 ± 29 psi (3.20 ± 0.2 MPa) |

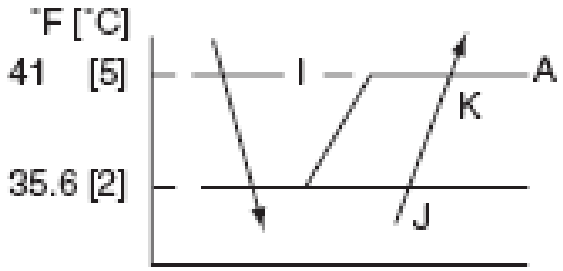
# Freeze Protection

## COOL/DRY Operation

Tc or Tcj temperatures are monitored

If zone J is detected for 6 minutes, the commanded frequency is decreased from operational frequency

The frequency drops every 30 seconds while in zone J




In zone K the frequency is maintained and the counting is interrupted

In zone I the timer is cleared and operation goes back to normal

If the commanded frequency becomes S0 because the operation continues in zone J, the coil temperature is raised from 41°F (5°C) to 53.6°F (12°C) before I is recognized and the fan runs in low speed

# Freeze Protection - Continued

Heating operation

This protection can be activated in the heating mode if the 4-way valve fails.

J zones shifts downward to 23°F (-5°C) from 35.6°F (2°C)

One of two conditions will have to be met 5 minutes after activation

- Tcn≤ Tc (n-1) -5 or
- Tcn <Tcn ( n-1) -1 and Tcn ≤ Ta < 41°F (5°C)

Tcn = Tc temperature 5 minutes after activation

Tc (n-1) = Tc temperature at start time

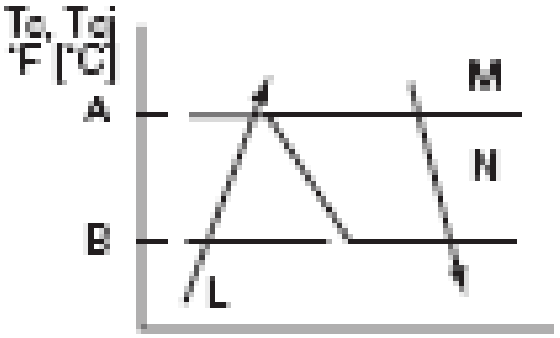
# High-Temperature Release Control

When the M zone is detected, the compressor frequency is decreased every 30 seconds.

In zone N, the frequency is maintained

When zone L detected, the frequency is returned to original value at the rate of 6 Hz/60 sec.

At the start of the operation or when Tc or Tcj < 86°F (30°C), temperature is controlled between values in parentheses.




Setup at shipment

| Control temp. °F (°C) | |
|---|---|
| A | B |
| 132.8 (56) (129.2 (54)) | 125.6 (52) (125.6 (52)) |



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# SERVICE CONTENT


Example of RAV-SP240AT2-UL

Example of RAV-SP420AT2-UL

Cassette Wiring Diagram

Cassette Indoor Board

Cassette – Specification of Electrical Parts

Under Ceiling Wiring Diagram

Under Ceiling Indoor Board

Under Ceiling – Specification of Electrical Parts

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High Wall Indoor Unit Board

High Wall Specification of Electrical Parts

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Sensor, Current, Compressor Operation Frequency, PMV Opening Display

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All Units Diagnostic Flow Charts – [E09] Error

All Units Diagnostic Flow Charts – [E02] Error

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Cassette Diagnostic Flow Charts – [E04] Error

Cont….

# SERVICE CONTENT

Under Ceiling Diagnostic Flow Charts – [E04] Error

All Units Diagnostic Flow Charts – [E10] Error

All Units Diagnostic Flow Charts – [E08, L03, L07, L08] Error

All Units Diagnostic Flow Charts – [L09] Error

High Wall Diagnostic Flow Charts – [E18] Error

Cassette and Under Ceiling Diagnostic Flow Charts – [E18] Error

All Units Diagnostic Flow Charts – [F10] Error

Cassette and Under Ceiling  Diagnostic Flow Charts – [P10] Error

High Wall Diagnostic Flow Charts – [P12] Error

Cassette and Under Ceiling Diagnostic Flow Charts – [P12] Error

All Units Diagnostic Flow Charts – [F01] Error

All Units Diagnostic Flow Charts – [F02] Error

High Wall Diagnostic Flow Charts – [F29] Error

Diagnostic Procedure – Outdoor Units

RAV-SP180AT2-UL – [E04] Error

RAV-SP180AT2-UL – [F04] Error

RAV-SP180AT2-UL – [F06] Error

RAV-SP180AT2-UL – [F08] Error

RAV-SP180AT2-UL – [F12] Error

RAV-SP180AT2-UL – [H01] Error

Cont….

# SERVICE CONTENT



RAV-SP180AT2-UL – [H02] Error
RAV-SP180AT2-UL – [H03] Error
RAV-SP180AT2-UL – [L29] Error
RAV-SP180AT2-UL – [P03] Error
RAV-SP180AT2-UL – [P04] Voltage Error
RAV-SP180AT2-UL – [P04] High Pressure Switch Error
RAV-SP180AT2-UL – [P05] Error
RAV-SP180AT2-UL – [P19] Error
RAV-SP180AT2-UL – [P22] Error
RAV-SP180AT2-UL – [P26] Error
RAV-SP180AT2-UL – [P29] Error
RAV-SP240 - 420AT2-UL – LED Display
RAV-SP240 - 420AT2-UL – [E04] Error
RAV-SP240 - 420AT2-UL – [F04] Error
RAV-SP240 - 420AT2-UL – [F06] Error
RAV-SP240 - 420AT2-UL – [F07] Error
RAV-SP240 - 420AT2-UL – [F08] Error
RAV-SP240 - 420AT2-UL – [F12] Error
RAV-SP240 - 420AT2-UL – [F13] Error
RAV-SP240 - 420AT2-UL – [F15] Error
RAV-SP240 - 420AT2-UL – [F31] Error

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# SERVICE CONTENT



RAV-SP240 - 420AT2-UL – [H01] Error
RAV-SP240 - 420AT2-UL – [H02] Error
RAV-SP240 - 420AT2-UL – [H03] Error
RAV-SP240 - 420AT2-UL – [H04] Error
RAV-SP240 - 420AT2-UL – [L10] Error
RAV-SP240 - 420AT2-UL – [L29] Error
RAV-SP240 - 420AT2-UL – [P03] Error
RAV-SP240 - 420AT2-UL – [P04] Error
RAV-SP240 - 420AT2-UL – [P05] Error
RAV-SP240 - 420AT2-UL – [P07] Error
RAV-SP240 - 420AT2-UL – [P15] Error
RAV-SP240 - 420AT2-UL – [P19] Error
RAV-SP240 - 420AT2-UL – [P20] Error
RAV-SP240 - 420AT2-UL – [P22] Error
RAV-SP240 - 420AT2-UL – [P26] Error
RAV-SP240 - 420AT2-UL – [P29] Error
RAV-SP240 - 420AT2-UL – No Code Error
Trouble Shooting  High Wall Units
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Step 1
Step 2 – Set Dip Switches and Jumpers on Replacement Board and Install it

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# SERVICE CONTENT

Step 3 – Turn On The Indoor Unit

Step 4 – Write the Set Data to EEPROM

Replacement of Outdoor Service P.C. Boards

Dip switch settings

Set Jumper Wires

Refrigerant recovery function (Forced cooling operation mode) RAV-SP180AT2-UL

Refrigerant recovery function (Forced cooling operation mode) RAV-SP240/300/360/420AT2-UL

Forced Defrost – Wired Remote Control Only.

Cassettes Service Procedures

TOSHIBA Carrier

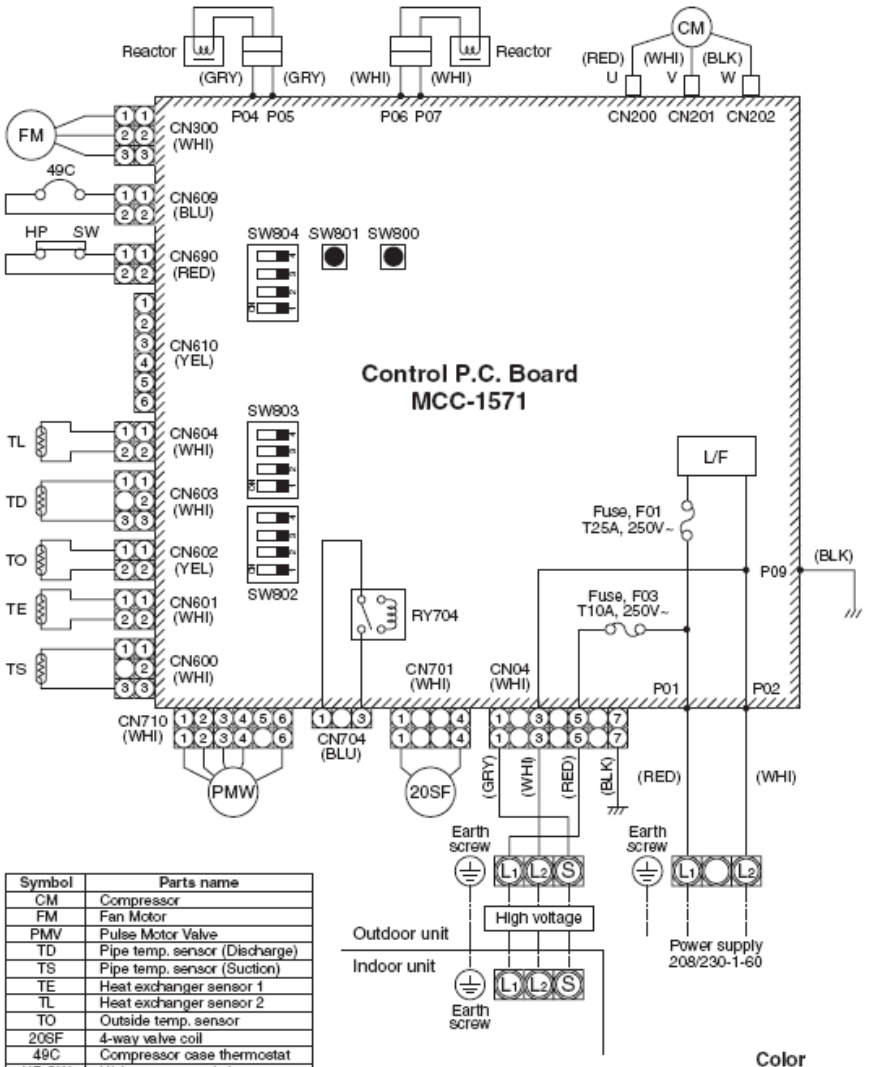
Service

## Example of RAV-SP240AT2-UL

RAV-SP240AT2-UL

| No. | Parts name | Type | Specifications |
|---|---|---|---|
| 1 | Compressor | DA220A2F-22L | — |
| 2 | Outdoor fan motor | ICF-280-A60-1 | Output 60 W |
| 3 | Reactor | CH-56 | 5.6 mH, 18.5 A |
| 4 | 4-way valve coil | VHV-01AP552B1 | AC200 – 240 V |
| 5 | PMV coil | CAM-MD12TF-15 | DC12 V |
| 6 | P.C. board | MCC-1571 | AC208 / 230 V |
| 7 | Fuse (Mounted on P.C. board) | — | AC250 V, 25 A |
| 8 | Fuse (Mounted on P.C. board) | — | AC250 V, 10 A |
| 9 | Fuse (Mounted on P.C. board) | — | AC250 V, 3.15 A |
| 10 | Outdoor temp. sensor (TO sensor) | — | 10 kΩ at 77°F (25°C) |
| 11 | Heat exchanger sensor (Te sensor) | — | 10 kΩ at 77°F (25°C) |
| 12 | Discharge temp. sensor (Td sensor) | — | 50 kΩ at 77°F (25°C) |
| 13 | Heat exchanger Temp sensor (Ts sensor) | — | 10 kΩ at 77°F (25°C) |
| 14 | Compressor thermo. (Protection) | US-622 | OFF : 257 ± 39.2°F (125 ± 4°C),<br>ON : 194 ± 41°F (90 ± 5°C) |
| 15 | Pressure switch | ACB-4UB82W | OFF : 601.8 + 0 − 29 psi (4.15 + 0 − 0.2 MPa)<br>ON : 464 ± 28 psi (3.2 ± 0.2 MPa) |

RAV-SP240AT2-UL




| Symbol | Parts name |
|---|---|
| CM | Compressor |
| FM | Fan Motor |
| PMV | Pulse Motor Valve |
| TD | Pipe temp. sensor (Discharge) |
| TS | Pipe temp. sensor (Suction) |
| TE | Heat exchanger sensor 1 |
| TL | Heat exchanger sensor 2 |
| TO | Outside temp. sensor |
| 20SF | 4-way valve coil |
| 49C | Compressor case thermostat |
| HP SW | High pressure switch |
| RY | Relay |
| L/F | Line Filter |

1. ○ Indicates the terminal block.
   Alphanumeric characters in the cycle indicate the terminal No.
2. The two-dot chain line indicates the wiring procured locally.
3. ▨ Indicates the P.C. board.
4. For the indoor unit circuit, refer to the wiring diagram of the indoor unit.

**Color Identification**

| | | |
|---|---|---|
| BLK | : | BLACK |
| BLU | : | BLUE |
| RED | : | RED |
| GRY | : | GRAY |
| WHI | : | WHITE |
| YEL | : | YELLOW |



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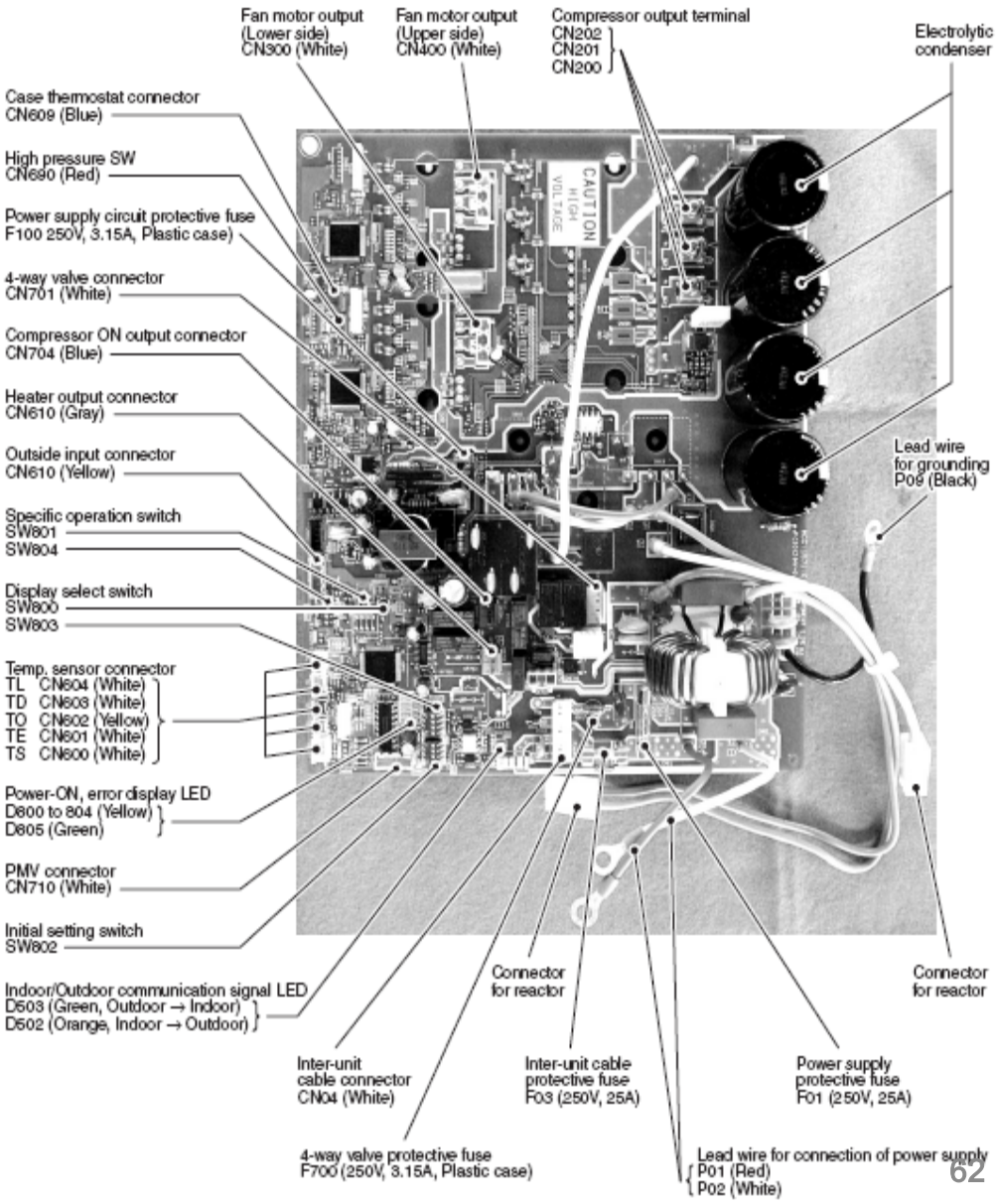
Example of RAV-SP420AT2-UL

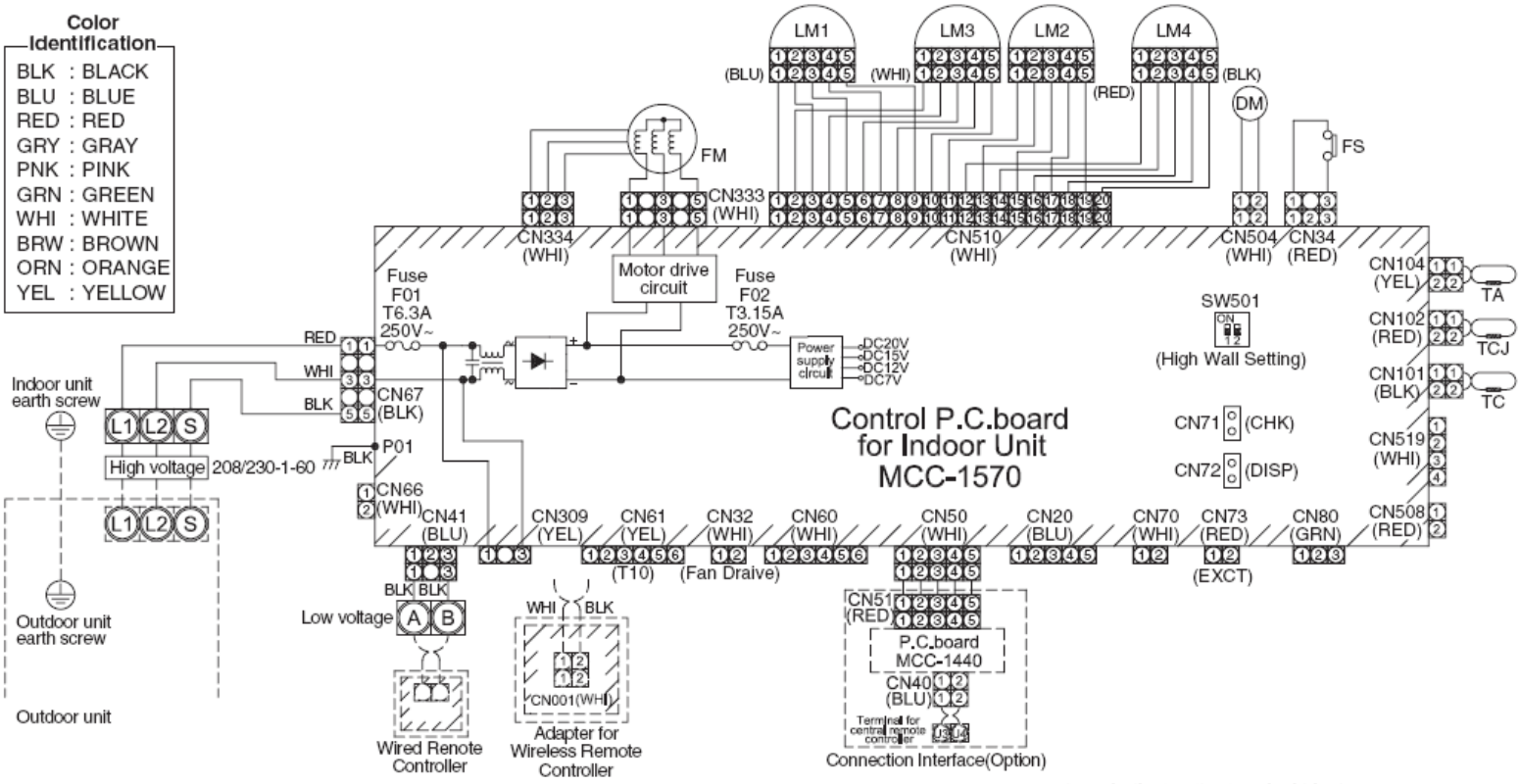

Fan motor output (Lower side) CN300 (White)
Fan motor output (Upper side) CN400 (White)
Compressor output terminal CN202 CN201 CN200
Electrolytic condenser
Case thermostat connector CN609 (Blue)
High pressure SW CN680 (Red)
Power supply circuit protective fuse F100 250V, 3.15A, Plastic case)
4-way valve connector CN701 (White)
Compressor ON output connector CN704 (Blue)
Heater output connector CN610 (Gray)
Outside input connector CN610 (Yellow)
Specific operation switch SW801 SW804
Display select switch SW800 SW803
Temp. sensor connector TL CN604 (White) TD CN603 (White) TO CN602 (Yellow) TE CN601 (White) TS CN600 (White)
Power-ON, error display LED D800 to 804 (Yellow) D805 (Green)
PMV connector CN710 (White)
Initial setting switch SW802
Indoor/Outdoor communication signal LED D503 (Green, Outdoor → Indoor) D502 (Orange, Indoor → Outdoor)
Lead wire for grounding P09 (Black)
Connector for reactor
Connector for reactor
Inter-unit cable connector CN04 (White)
Inter-unit cable protective fuse F03 (250V, 25A)
Power supply protective fuse F01 (250V, 25A)
4-way valve protective fuse F700 (250V, 3.15A, Plastic case)
Lead wire for connection of power supply P01 (Red) P02 (White)

# Cassette Wiring Diagram

| Symbol | Parts Name |
|---|---|
| FM | Fan Motor |
| TA | Indoor temp sansor |
| TC,TCJ | Temp sensor |
| LM1,2,3,4 | Louver motor |
| DM | Drain pump motor |
| FS | Float switch |

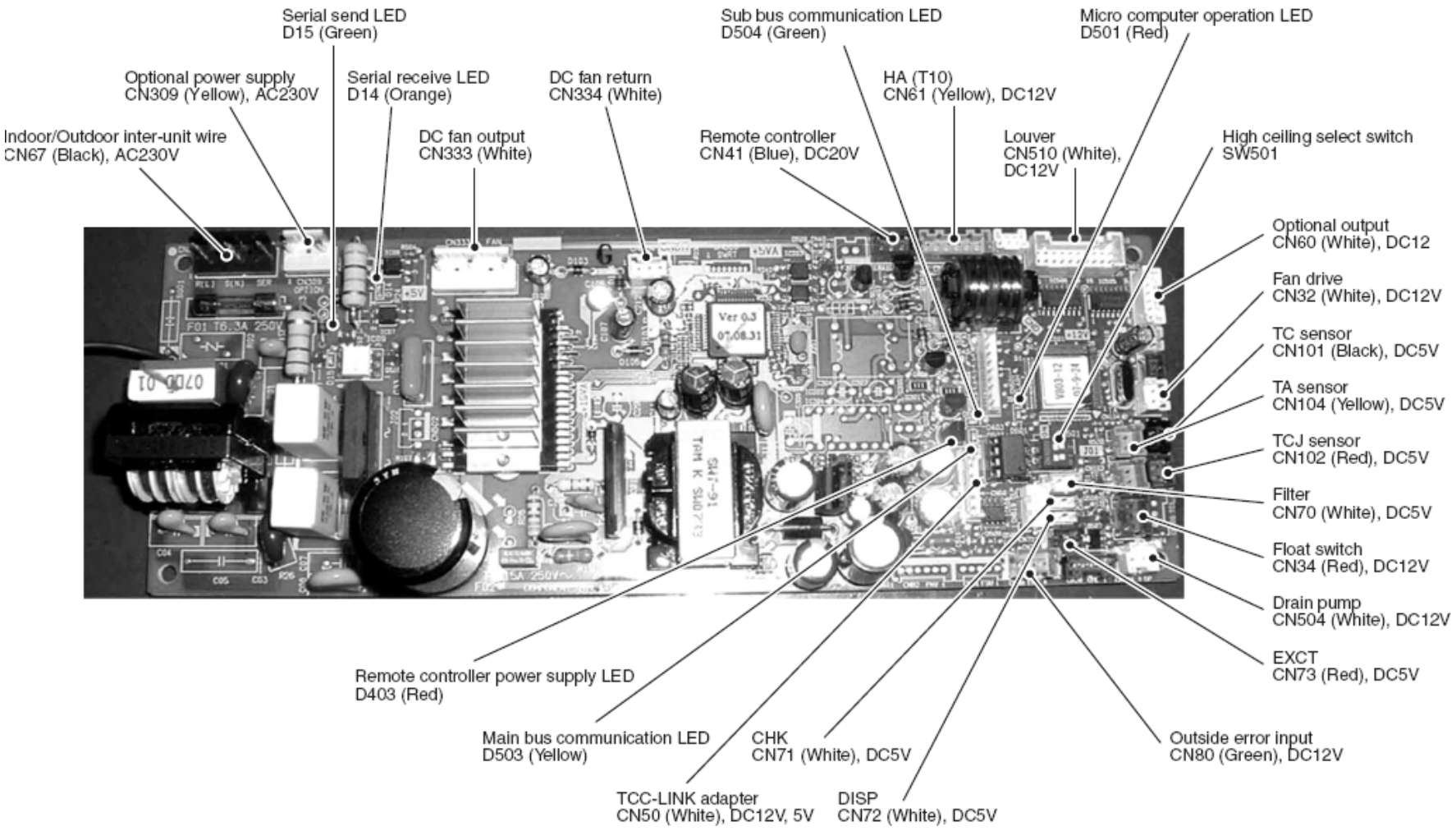
**Color Identification**

BLK : BLACK
BLU : BLUE
RED : RED
GRY : GRAY
PNK : PINK
GRN : GREEN
WHI : WHITE
BRW : BROWN
ORN : ORANGE
YEL : YELLOW




1. ◎ indicates the terminal block. Letter at inside indicates the terminal number.
2. A dotted line and broken line Indicate the wiring at site.
3. ▨ Indicates the control P.C.board.

# Cassette Indoor Board



# Cassette – Specification of Electrical Parts

RAV-SP180UT-UL, RAV-SP240UT-UL

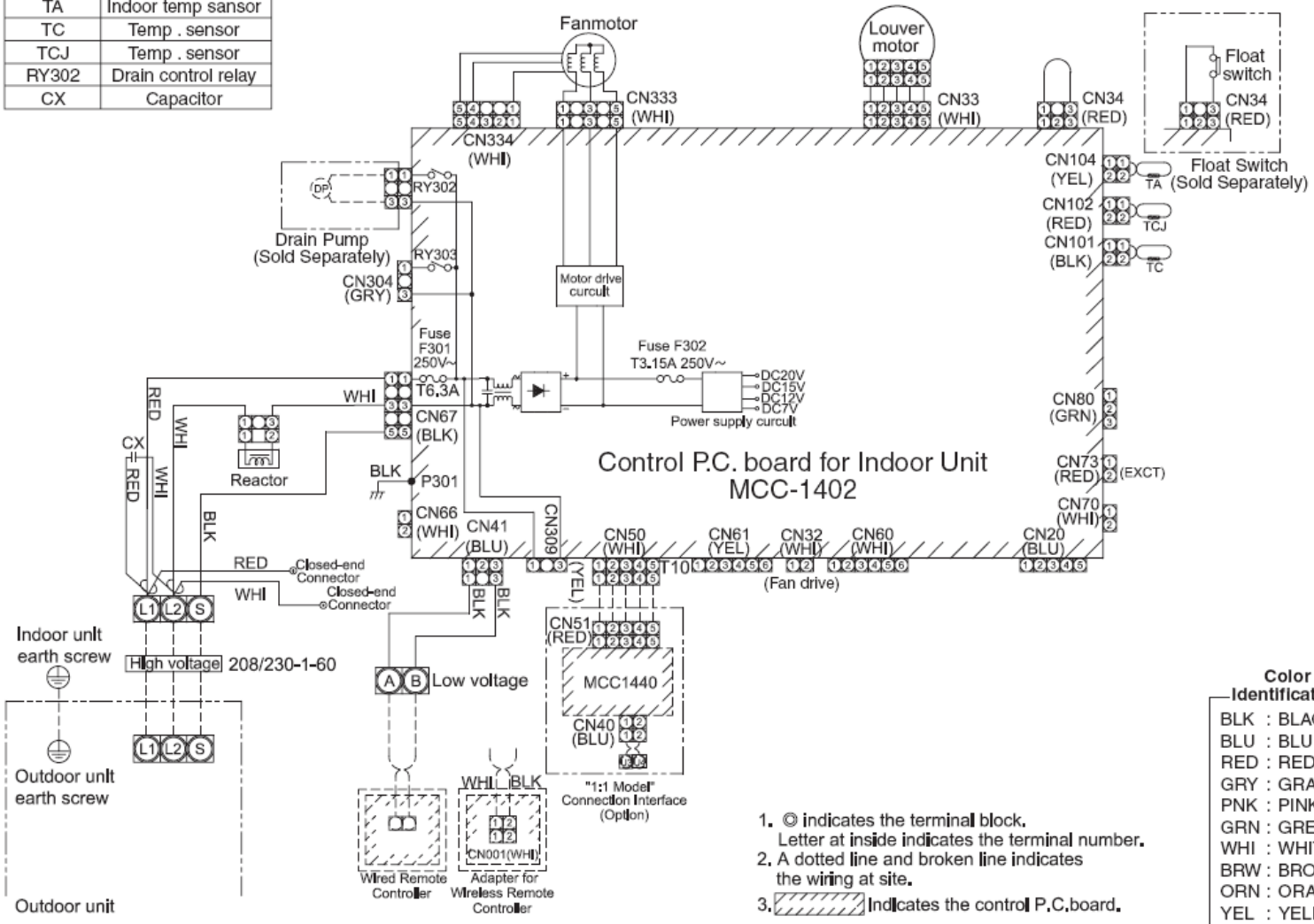
| No. | Parts name | Type | Specifications |
|---|---|---|---|
| 1 | Fan motor (for indoor) | SWF-340U60-2 | Output (Rated) 60 W |
| 2 | Thermo. sensor (TA-sensor) | 328 mm | 10 kΩ at 77°F (25°C) |
| 3 | Heat exchanger sensor (TCJ-sensor) | Ø6 mm, 1000 mm | 10 kΩ at 77°F (25°C) |
| 4 | Heat exchanger sensor (TC-sensor) | Ø6 mm, 1000 mm | 10 kΩ at 77°F (25°C) |
| 5 | Float switch | FS-0218-102 | — |
| 6 | Drain pump motor | MDP-1401 | — |

RAV-SP300UT-UL, RAV-SP360UT-UL, RAV-SP420UT-UL

| No. | Parts name | Type | Specifications |
|---|---|---|---|
| 1 | Fan motor | ICF-340U150-1 | Output (Rated) 150 W |
| 2 | Thermo. sensor (TA-sensor) | 328 mm | 10 kΩ at 77°F (25°C) |
| 3 | Heat exchanger sensor (TCJ-sensor) | Ø6 mm, 1000 mm | 10 kΩ at 77°F (25°C) |
| 4 | Heat exchanger sensor (TC-sensor) | Ø6 mm, 1000 mm | 10 kΩ at 77°F (25°C) |
| 5 | Float switch | FS-0218-102 | — |
| 6 | Drain pump motor | MDP-1401 | — |

# Under Ceiling Wiring Diagram

| Symbol | Parts Name |
|---|---|
| DP | Drain pump motor |
| TA | Indoor temp sansor |
| TC | Temp . sensor |
| TCJ | Temp . sensor |
| RY302 | Drain control relay |
| CX | Capacitor |

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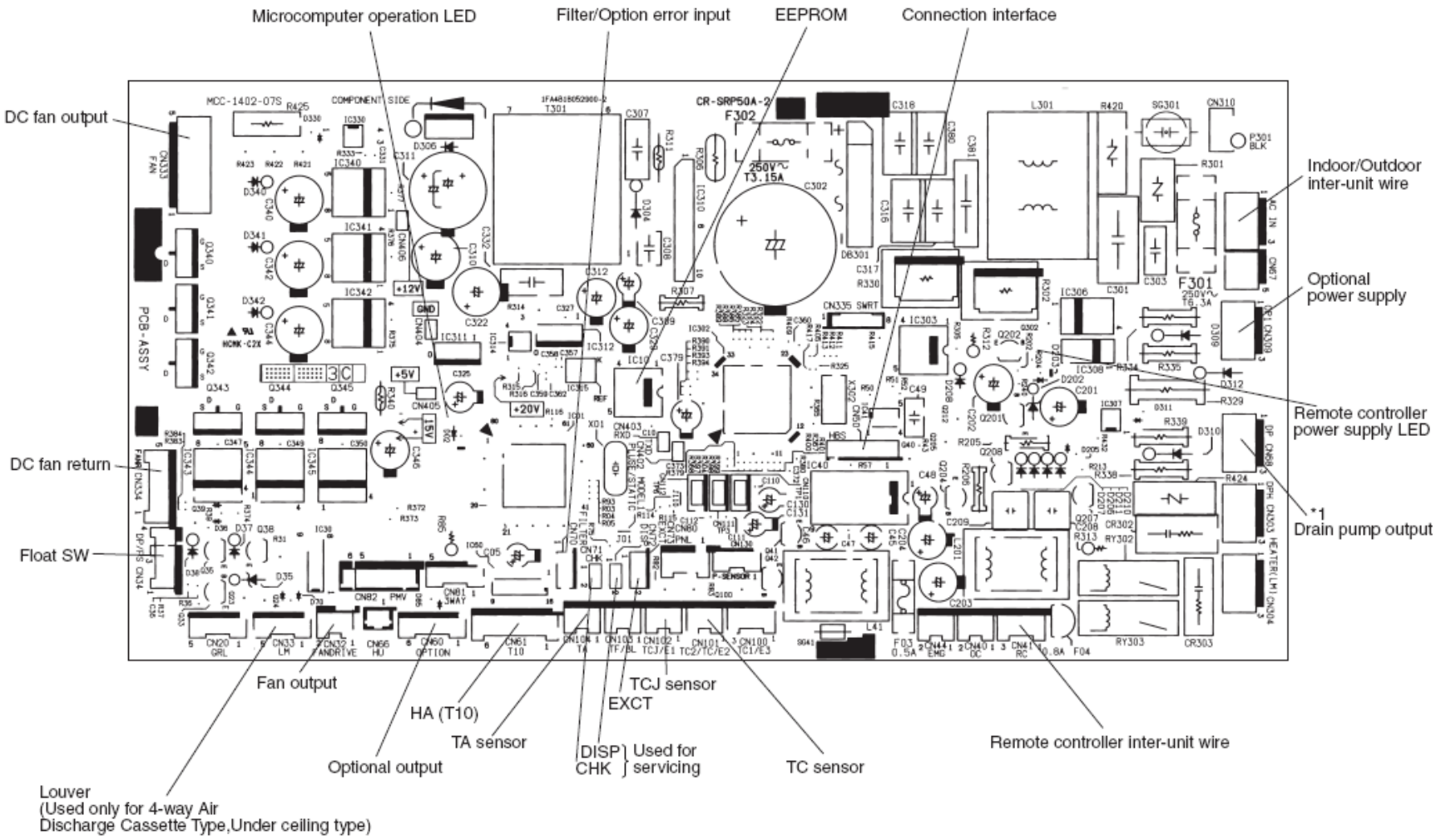
# Under Ceiling Indoor Board

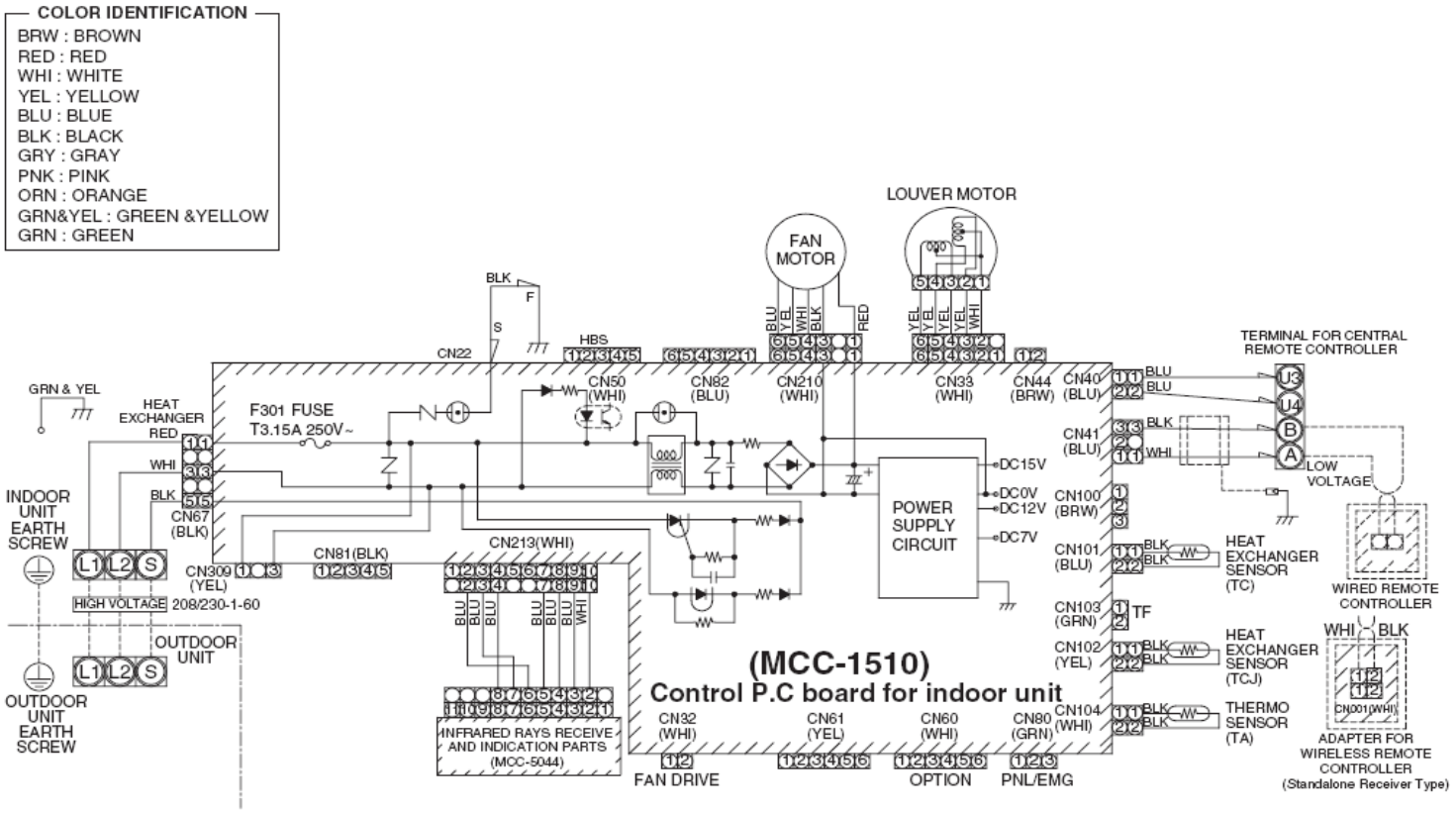


# Under Ceiling – Specification of Electrical Parts

## RAV-SP180CT-UL, RAV-SP240CT-UL, RAV-SP300CT-UL, RAV-SP360CT-UL, RAV-SP420CT-UL

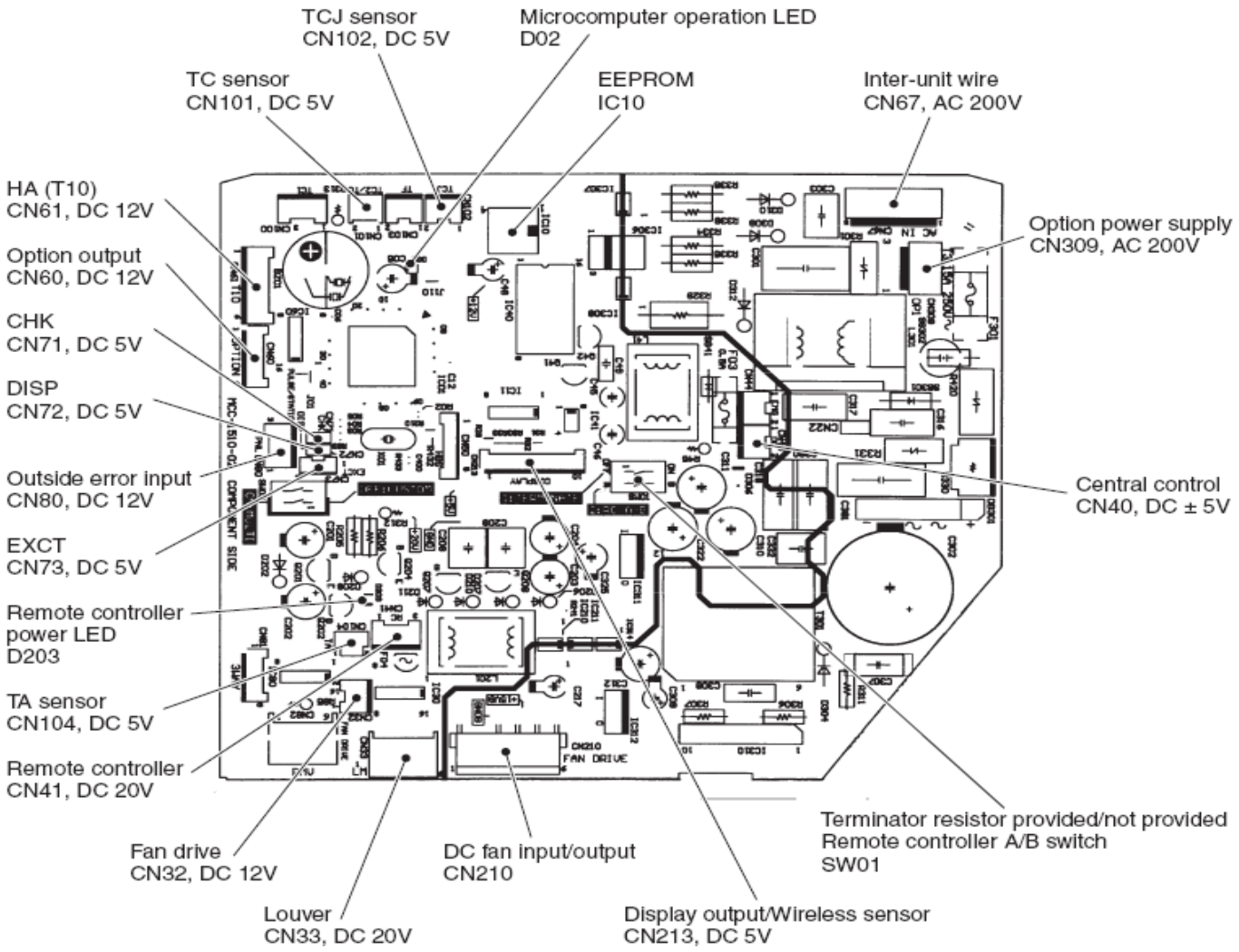
| No. | Parts name | Type | Specifications |
|---|---|---|---|
| 1 | Fan motor (SP180CT-UL) | SWF-340U60-1A | Output (Rated) 60 W |
| 2 | Fan motor (SP240CT-UL) | SWF-340U60-2A | Output (Rated) 60 W |
| 3 | Fan motor (SP300, 360, 420CT-UL) | SWF-340U120-2A | Output (Rated) 120 W |
| 4 | Thermo. sensor (TA-sensor) | 155 mm | 10 kΩ at 77°F (25°C) |
| 5 | Heat exchanger sensor (TCJ-sensor) | Ø6 mm, 1200 mm | 10 kΩ at 77°F (25°C) |
| 6 | Heat exchanger sensor (TC-sensor) | Ø6 mm, 1200 mm | 10 kΩ at 77°F (25°C) |
| 7 | Louver motor | MP24Z2N | DC 12 V |
| 8 | Reactor | CH-43-2Z-T | 10 mH, 1 A |

# High Wall Wiring Diagram




1. ○ indicates the terminal block.
   Letter at inside indicates the terminal number.
2. A dotted line and broken line indicate the wiring at site.
3. ▨ indicates the control P.C.board.

# High Wall Indoor Unit Board



# High Wall Specification of Electrical Parts

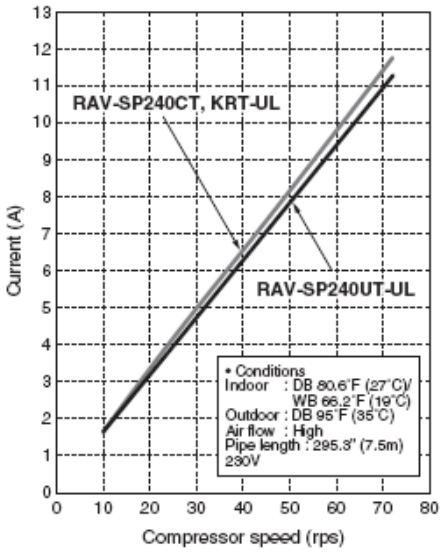
## RAV-SP180KRT-UL, RAV-SP240KRT-UL

| No. | Parts Name | Type | Specications |
|---|---|---|---|
| 1 | Fan motor (for indoor) | ICF-340U30-1 | Output (Rated) 30W, 340V DC |
| 2 | Grille motor | MP24Z3T | Output (Rated) 1W, 16 poles DC |
| 3 | Thermo. Sensor (TA sensor) | 318mm | 10kΩ at 77°F (25°C) |
| 4 | Heat exchanger sensor (TC sensor) | Ø6,800mm | 10kΩ at 77°F (25°C) |
| 5 | Heat exchanger sensor (TCJ sensor) | Ø6,800mm | 10kΩ at 77°F (25°C) |

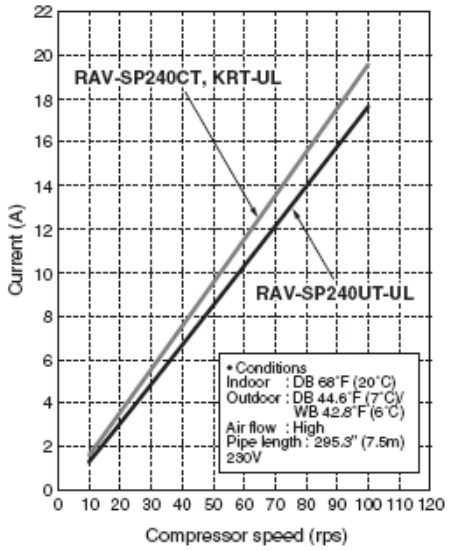
## Example of RAV-SP240AT2-UL

RAV-SP240AT2-UL

<Cooling>




<Heating>




| | | Pressure (psi) | | Pressure (MPa) | | Pipe surface temperature °F (°C) Discharge (TD) | Suction (TS) | Indoor heat exchanger (TC) | Outdoor heat exchanger (TE) | Compressor drive revolution frequency (rps) | Indoor fan | Indoor/Outdoor temp. conditions (DB/WB) °F °C) Indoor | Outdoor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pd | Ps | Pd | Ps | | | | | | | | |
| Cooling | Standard | 404.6 | 129.1 | 2.79 | 0.89 | 158 (70) | 55.4 (13) | 51.8 (11) | 102.2 (39) | 58.2 | HIGH | 80.6/66.2 (27/19) | 95/– (35/–) |
| | Overload | 511.9 | 155.2 | 3.53 | 1.07 | 177.8 (81) | 62.6 (17) | 57.2 (14) | 118.4 (48) | 65 | HIGH | 89.6/75.2 (32/24) | 109.4/– (43/–) |
| | Low load | 248.0 | 104.4 | 1.71 | 0.72 | 107.6 (42) | 44.6 ( 7) | 37.4 ( 3) | 64.4 (18) | 30 | LOW | 64.4/59.9 (18/15.5) | 23/– (–5/–) |
| Heating | Standard | 384.3 | 98.6 | 2.65 | 0.68 | 165.2 (74) | 39.2 ( 4) | 111.2 (44) | 37.4 ( 3) | 61.5 | HIGH | 68 (20/–) | 44.6/42.8 (7/6) |
| | Overload | 464.0 | 161.0 | 3.2 | 1.11 | 168.8 (76) | 66.2 (19) | 125.6 (52) | 59 (15) | 28 | LOW | 86/– (30/–) | 75.2/64.4 (24/18) |
| | Low load | 337.9 | 80.5 | 2.33 | 0.21 | 199.4 (93) | –0.4 (–18) | 87.8 (31) | –4 (–20) | 99.5 | HIGH | 59/– (15/–) | 5/– (–15/–) |

# Temperature Sensor – Temperature – Resistance Values

## TA, TC, TCJ, TE, TS, TO sensors

Representative value

| Temperature °F (°C) | Resistance value (kΩ) | | |
|---|---|---|---|
| | (Minimum value) | (Standard value) | (Maximum value) |
| 32 ( 0) | 32.33 | 33.80 | 35.30 |
| 50 ( 10) | 19.63 | 20.35 | 21.09 |
| 68 ( 20) | 12.23 | 12.59 | 12.95 |
| 77 ( 25) | 9.75 | 10.00 | 10.25 |
| 86 ( 30) | 7.764 | 7.990 | 8.218 |
| 104 ( 40) | 5.013 | 5.192 | 5.375 |
| 122 ( 50) | 3.312 | 3.451 | 3.594 |
| 140 ( 60) | 2.236 | 2.343 | 2.454 |
| 158 ( 70) | 1.540 | 1.623 | 1.709 |
| 176 ( 80) | 1.082 | 1.146 | 1.213 |
| 194 ( 90) | 0.7740 | 0.8237 | 0.8761 |
| 212 (100) | 0.5634 | 0.6023 | 0.6434 |

## TD, TL sensors

Representative value

| Temperature °F (°C | Resistance value (kΩ) | | |
|---|---|---|---|
| | (Minimum value) | (Standard value) | (Maximum value) |
| 32 ( 0) | 150.5 | 161.3 | 172.7 |
| 50 ( 10) | 92.76 | 99.05 | 105.6 |
| 68 ( 20) | 58.61 | 62.36 | 66.26 |
| 77 ( 25) | 47.01 | 49.93 | 52.97 |
| 86 ( 30) | 37.93 | 40.22 | 42.59 |
| 104 ( 40) | 25.12 | 26.55 | 28.03 |
| 122 ( 50) | 17.00 | 17.92 | 18.86 |
| 140 ( 60) | 11.74 | 12.34 | 12.95 |
| 158 ( 70) | 8.269 | 8.668 | 9.074 |
| 176 ( 80) | 5.925 | 6.195 | 6.470 |
| 194 ( 90) | 4.321 | 4.507 | 4.696 |
| 212 (100) | 3.205 | 3.336 | 3.468 |

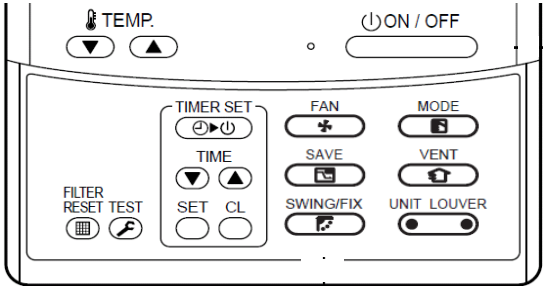
# Test Run Setup – Wired Remote

a : Push TEST button for more than 4 sec .

b : " TEST " display in the panel.

c : Select operation mode cooling or heating.

d : Push ON / OFF button to start .




e : After test run , push again TEST button and check " TEST " disappear.

===> Goes into normal operation

Temp control is unavailable / Fan speed is controllable .

Compressor frequency is fixed as approximately 40 – 50 Hz.

Check code is available.

Test run must be done only as TEST, otherwise the unit may be risky. After 60 minutes test mode will stop automatically.

# Test Run Setup – Wireless Remote

| Procedure | Description | |
|---|---|---|
| 1 | Turn on power of the air conditioner. | |
| | The operation is not accepted for 5 minutes when power has been turned on at first time after installation, and 1 minute when power has been turned on at the next time and after.<br>After the specified time has passed, perform a test operation. | |
| 2 | Push [**Start/Stop**] button and change the operation mode to [**COOL**] or [**HEAT**] with [**Mode**] button. Then change the fan speed to [**High**] using [**Fan**] button. | |
| | **Test cooling operation** | **Test heating operation** |
| 3 | Set temperature to [64°F (18°C)] using [**Temperature set**] button. | Set temperature to [86°F (30°C)] using [**Temperature set**] button. |
| 4 | After checking the receiving sound "Pi", immediately push [**Temperature set**] button to set to [66°F (19°C)] | After checking the receiving sound "Pi", immediately push [**Temperature set**] button to set to [84°F (29°C)]. |
| 5 | After checking the receiving sound "Pi", immediately push [**Temperature set**] button to set to [64°F (18°C)]. | After checking the receiving sound "Pi", immediately push [**Temperature set**] button to set to [86°F (30°C)]. |
| 6 | Then repeat the procedure 4 → 5 → 4 → 5.<br>After approx. 10 seconds, all the display lamps on the sensor part of wireless remote controller, [**Operation**] (Green), [**Timer**] (Green), and [**Ready**] (Yellow) flash and the air conditioner starts operation.<br>If the lamps do not flash, repeat the procedure 2 and after. | |
| 7 | After the test operation, push [**Start/Stop**] button to stop the operation. | |

# Test Run Setup – Wireless Receiver Board (Cassette)

a. Unit power OFF ,and remove receiver part of wireless remote controller.

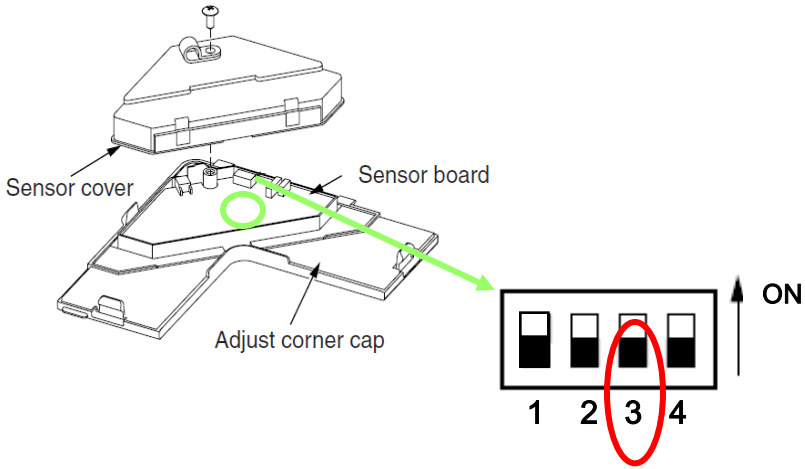
b. Turn " S003 _bit 1 " OFF to ON.

c. Reassemble receiver part to the unit ,and Unit power ON.

d. Select operation mode cooling or heating.

e. Push ⏻ON / OFF button to start.

f. After test run , push ⏻ON / OFF to stop and set S003 position to initial.




Temp control is unavailable / Fan speed is controllable .

Compressor frequency is fixed as approximately 40 – 50 Hz.

Check code is available.

Test Run must be done only as test, otherwise the unit may be risky.

After 60 min test mode will stop automatically.

"S003 _bit 1 " OFF to ON.

# Test Run Setup – High Walls

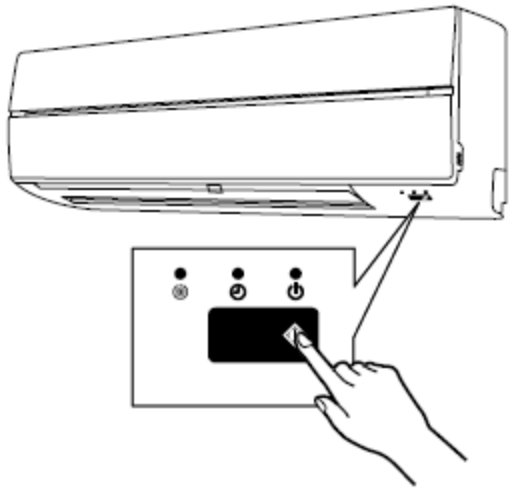
Push TEMPORAY button for 10 seconds

The unit enters forced cooling in about 3 minutes and a beep is heard

Unit can be checked.

Push the TEMPORARY button for 1 second to stop the forced cooling operation.

To enter AUTO mode, push the TEMPORARY button for 1 second.



# Monitor Function of Remote Control – Cassettes and Under Ceiling

a. Push TEST + SET button simultaneously for more than 4 sec.

b. Push UNIT button to select the set unit when group operation.
The selected unit starts fan operation.

c. Read the cycle temperature
to pushing TEMP. ▼ ▲ ' TEMP SET " button.

d. Push TEST button to get to normal state.

| | Item code | Data name | Unit |
|---|---|---|---|
| Indoor unit data | 01 | Room temperature (Remote controller) | °C |
| | 02 | Indoor suction temperature (TA) | °C |
| | 03 | Indoor heat exchanger (Coil) temperature (TCJ) | °C |
| | 04 | Indoor heat exchanger (Coil) temperature (TC) | °C |
| | * 07 | Indoor fan revolution frequency | rpm |
| | * F2 | Indoor fan calculated operation time | ×100h |
| | F3 | Filter sign time | ×1h |
| | * F8 | Indoor discharge temperature*1 | °C |

| | Item code | Data name | Unit |
|---|---|---|---|
| Outdoor unit data | 60 | Outdoor heat exchanger (Coil) temperature (TE) | °C |
| | 61 | Outside temperature (TO) | °C |
| | 62 | Compressor discharge temperature (TD) | °C |
| | 63 | Compressor suction temperature (TS) | °C |
| | 65 | Heat sing temperature (THS) | °C |
| | 6A | Operation current | 1/10A |
| | * 6D | Outdoor heat exchanger (Coil) temperature (TL) | °C |
| | * 70 | Compressor operation frequency | rps |
| | * 72 | Outdoor fan revolution frequency (Lower) | rpm |
| | * 73 | Outdoor fan revolution frequency (Upper) | rpm |
| | F1 | Compressor calculated operation time | ×100h |

* Does not apply to Under Ceiling units

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# Monitor Function of Remote Control – High Wall Codes

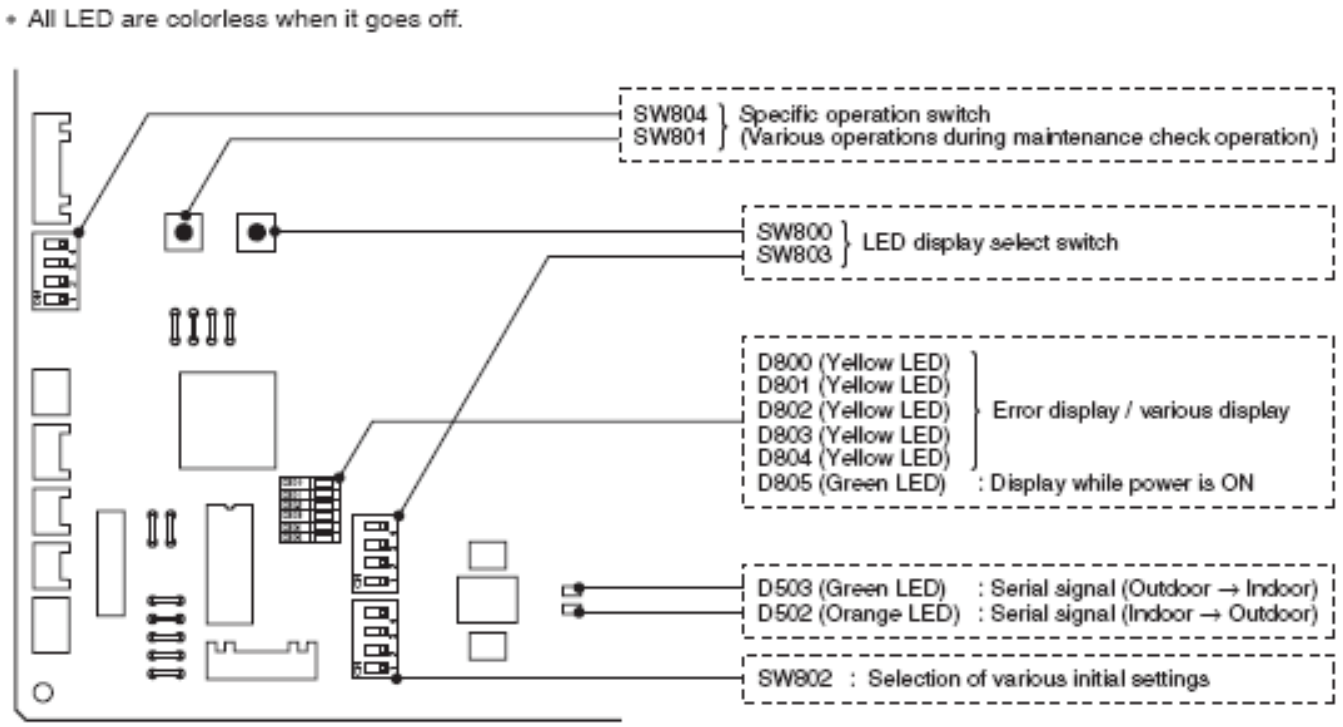
| | CODE No. | Data name |
|---|---|---|
| Indoor unit data | 00 | Room temperature under control *1 |
| | 01 | Room temperature (Remote controller) |
| | 02 | Indoor suction temperature (TA) |
| | 03 | Indoor heat exchanger (Coil) temperature (TCJ) |
| | 04 | Indoor heat exchanger (Coil) temperature (TC) |
| | 05 | Indoor heat exchanger temperature (TC1) |

| | CODE No. | Data name |
|---|---|---|
| Outdoor unit data | 60 | Outdoor heat exchanger (Coil) temperature (TE) |
| | 61 | Outside temperature (TO) |
| | 62 | Compressor discharge temperature (TD) |
| | 63 | Compressor suction temperature (TS) |
| | 65 | Heat sink temperature (THS) |

*1 Header indoor unit only under group control.

Setup procedure is the same as for the Cassettes and Under Ceiling units.

# Service Support Functions – Sizes 240 through 420


• All LED are colorless when it goes off.
SW804
SW801
Specific operation switch
(Various operations during maintenance check operation)
SW800
SW803
LED display select switch
D800 (Yellow LED)
D801 (Yellow LED)
D802 (Yellow LED)
D803 (Yellow LED)
D804 (Yellow LED)
Error display / various display
D805 (Green LED) : Display while power is ON
D503 (Green LED) : Serial signal (Outdoor → Indoor)
D502 (Orange LED) : Serial signal (Indoor → Outdoor)
SW802 : Selection of various initial settings

Two components to the board:

Dip switches to setup either ,select display list ,or perform specific operations to help in servicing the unit

LED's to display the requested information



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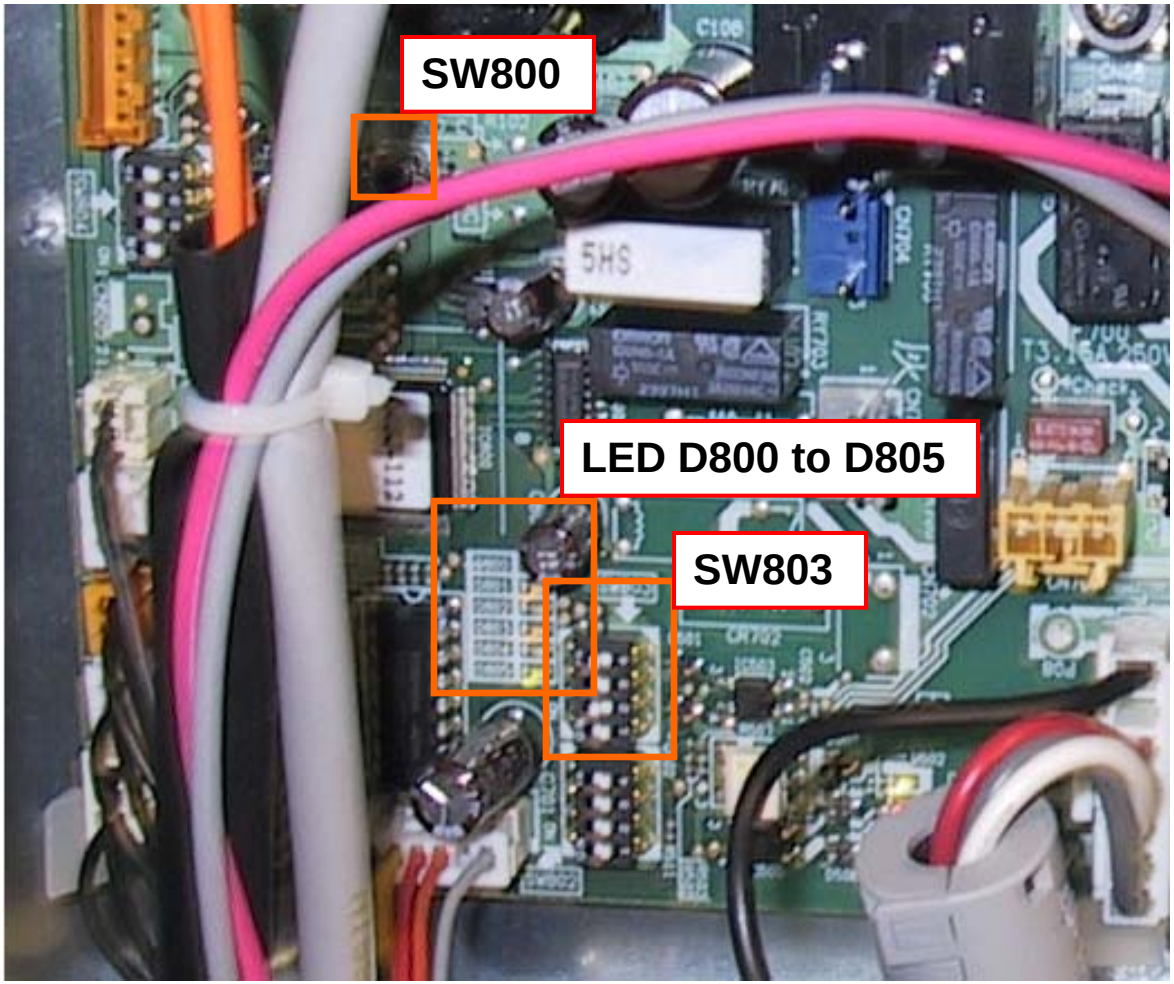
# Detail of D800 to D805 and SW803, SW800



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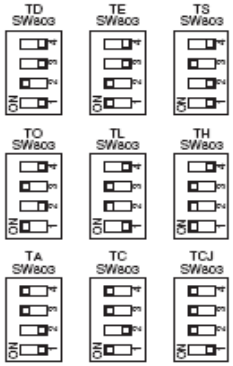
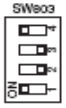
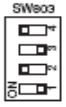
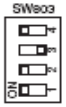
# Dip Switch SW803 – Setting List

| Switch | Function / Contents |
|---|---|
| | Error display (Error generating at present)<br>Error generating at present is displayed.<br>This switch goes off when an error does not generate. |
| | Error display (The latest error: Latest error including present)<br>After error status was cleared, the error which generated before can be confirmed by this setting. (Reconfirmation is available even if power supply was turned off once.)<br>• If an error generates at present, the same contents as those of error which is generating at present are displayed.<br>• Only error of TO sensor is not displayed by this setting. (Confirm it by setting of error which is generating at present.) |
|   | Temperature sensor display<br>The detected value of temperature sensor is displayed. |
|   | Current display<br>The current value which flows in the outdoor unit is displayed. |
|   | Compressor operation frequency display<br>The operation frequency of the compressor is displayed. |
|   | PMV opening display<br>The opening of PMV (Pulse Motor Valve) is displayed. |

# General LED Display

**Display part**

| Part No. | Specifications | Operation contents |
|---|---|---|
| D502 | Orange LED | Indoor/Outdoor communication (Serial communication) signal display<br>(Receive signal from indoor signal) |
| D503 | Green LED | Indoor/Outdoor communication (Serial communication) signal display<br>(Send signal from outdoor signal) |
| D800<br>to<br>D804 | Yellow LED | Error display<br>When all SW803 are OFF, or when any of D800 to D804 goes on, LED displays that the outdoor controller detects an error.<br>When status of SW803 is other than OFF, various indications are displayed. |
| D805 | Green LED | Power-ON display<br>When the power of the outdoor unit is turned on, LED goes on.<br>When SW801 and SW804 operate the specific operation, LED flashes. |

* All LED are colorless when it goes off.

# Error Display

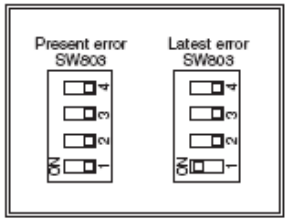
All Dip switches OFF – Current error

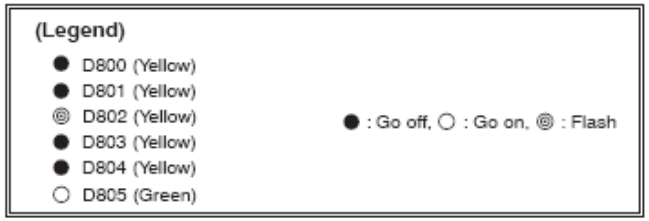
Dip switch <1> only ON – Previous error

If an error is detected, any of the LED D800 to D804 can illuminate (Display 1)

Push down SW800 for 1 sec., Display 1 changes into Display 2

Display 1 will be displayed again by pushing SW800 for 1 sec. or waiting for 2 minutes




| Display 1) (Initial display) | Display 2) (SW800 operation) | Error contents | Wired remote controller Error code |
|---|---|---|---|
| ●●●●●○ | ●●●●●○ | Normal | — |
| ○○●●○○ | ●●◎●●○ | Discharge temp. sensor (TD) error | F04 |
| | ●◎◎●●○ | Heat exchanger temp. sensor (TE) error | F06 |
| | ◎◎◎●●○ | Heat exchanger temp. sensor (TL) error | F06, F07 |
| | ●●●◎●○ | Outside temp. sensor (TO) error | F08 |
| | ●●◎◎●○ | Suction temp. sensor (TS) error | F06, F12 |
| | ◎●◎◎●○ | Heat sink temp. sensor (TH) error | F13, L29 |
| | ◎◎◎◎●○ | Heat exchanger sensor (TE, TS) miswiring | F06, F15 |
| | ◎◎◎◎◎○ | EEPROM error | F31, L29 |
| ●●○●○○ | ◎●●●●○ | Compressor break down | H01 |
| | ●◎●●●○ | Compressor lock | H02 |
| | ◎◎●●●○ | Current detection circuit error | H03 |
| | ●●◎●●○ | Case thermostat operation | H04 |
| ●○○●○○ | ●◎●◎●○ | Model unset | L10, L29 |
| | ◎●◎◎◎○ | Communication error between MCU | L29 |
| | ◎◎◎◎◎○ | Other error (Compressor disorder, etc.) | Error is not determined. |
| ○○○●○○ | ◎◎●●●○ | Discharge temp. error | P03 |
| | ●●◎●●○ | High-pressure SW error | P04 |
| | ◎●◎●●○ | Power supply error | P05 |
| | ◎◎◎●●○ | Heat sink overheat error | P07, L29 |
| | ◎◎◎◎●○ | Gas leak detection | P15, L29 |
| | ◎◎●●◎○ | 4-way valve reverse error | P19, L29 |
| | ●●◎●◎○ | High pressure protective operation | P04, P20 |
| | ●◎◎●◎○ | Fan system error | P22 |
| | ●◎●◎◎○ | Driving element short-circuit | P26 |
| | ◎●◎◎◎○ | Position detection circuit erro | P29 |



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# Sensor, Current, Compressor Operation Frequency, PMV Opening Display

(Legend)

- ● D800 (Yellow)
- ● D801 (Yellow)
- ● D802 (Yellow)
- ● D803 (Yellow)
- ● D804 (Yellow)
- ○ D805 (Green)

● : Go off, ○ : Go on

| LED display / Item setup | Temperature sensor °F (°C) (TD, TE, TS, TO, TL, TH, TA, TC, TCJ SW803) | Current (A) (SW803) | Compressor operation frequency (rpm) (SW803) | PMV opening (Pulse) (SW803) |
|---|---|---|---|---|
| ●●●●●○ | Below –13 (–25) | 0 to 0.9 | 0 to 4 | 0 to 19 |
| ○●●●●○ | –13 (–25) to –5.8 (–21) | 1 to 1.9 | 5 to 9 | 20 to 39 |
| ●○●●●○ | –4 (–20) to 3.2 (–16) | 2 to 2.9 | 10 to 14 | 40 to 59 |
| ○○●●●○ | 5 (–15) to 12.2 (–11) | 3 to 3.9 | 15 to 19 | 60 to 79 |
| ●●○●●○ | 14 (–10) to 23 ( –5) | 4 to 4.9 | 20 to 24 | 80 to 99 |
| ○●○●●○ | 23 ( –5) to 30.2 ( –1) | 5 to 5.9 | 25 to 29 | 100 to 119 |
| ●○○●●○ | 32 ( 0) to 39.2 ( 4) | 6 to 6.9 | 30 to 34 | 120 to 139 |
| ○○○●●○ | 41 ( 5) to 48.2 ( 9) | 7 to 7.9 | 35 to 39 | 140 to 159 |
| ●●●○●○ | 50 ( 10) to 57.2 ( 14) | 8 to 8.9 | 40 to 44 | 160 to 179 |
| ○●●○●○ | 59 ( 15) to 66.2 ( 19) | 9 to 9.9 | 45 to 49 | 180 to 199 |
| ●○●○●○ | 68 ( 20) to 75.2 ( 24) | 10 to 10.9 | 50 to 54 | 200 to 219 |
| ○○●○●○ | 77 ( 25) to 84.2 ( 29) | 11 to 11.9 | 55 to 59 | 220 to 239 |
| ●●○○●○ | 86 ( 30) to 93.2 ( 34) | 12 to 12.9 | 60 to 64 | 240 to 259 |
| ○●○○●○ | 95 ( 35) to 102.2 ( 39) | 13 to 13.9 | 65 to 69 | 260 to 279 |
| ●○○○●○ | 104 ( 40) to 111.2 ( 44) | 14 to 14.9 | 70 to 74 | 280 to 299 |
| ○○○○●○ | 113 ( 45) to 120.2 ( 49) | 15 to 15.9 | 75 to 79 | 300 to 319 |
| ●●●●○○ | 122 ( 50) to 129.2 ( 54) | 16 to 16.9 | 80 to 84 | 320 to 339 |
| ○●●●○○ | 131 ( 55) to 138.2 ( 59) | 17 to 17.9 | 85 to 89 | 340 to 359 |
| ●○●●○○ | 140 ( 60) to 147.2 ( 64) | 18 to 18.9 | 80 to 84 | 360 to 379 |
| ○○●●○○ | 149 ( 65) to 156.2 ( 69) | 19 to 19.9 | 95 to 99 | 380 to 399 |
| ●●○●○○ | 158 ( 70) to 165.2 ( 74) | 20 to 20.9 | 100 to 104 | 400 to 419 |
| ○●○●○○ | 167 ( 75) to 174.2 ( 79) | 21 to 21.9 | 105 to 109 | 420 to 439 |
| ●○○●○○ | 176 ( 80) to 183.2 ( 84) | 22 to 22.9 | 110 to 114 | 440 to 459 |
| ○○○●○○ | 185 ( 85) to 192.2 ( 89) | 23 to 23.9 | 115 to 119 | 460 to 479 |
| ●●●○○○ | 194 ( 90) to 201.2 ( 94) | 24 to 24.9 | 120 to 124 | 480 to 499 |
| ○●●○○○ | 203 ( 95) to 210.2 ( 99) | 25 to 25.9 | 125 to 129 | 500 |
| ●○●○○○ | 212 (100) to 219.2 (104) | 26 to 26.9 | 130 to 134 | — |
| ○○●○○○ | 221 (105) to 228.2 (109) | 27 to 27.9 | 135 to 139 | — |
| ●●○○○○ | 230 (110) to 237.2 (114) | 28 to 28.9 | 140 to 144 | — |
| ○●○○○○ | 239 (115) to 246.2 (119) | 29 to 29.9 | 145 to 149 | — |
| ●○○○○○ | Over 248 (120) | 30 to 30.9 | 150 to 154 | — |
| ○○○○○○ | Sensor error, unconnected | Over 31 | Over 155 | — |

# Dip Switch SW804– Specific Operation List

Set the Dip Switches on SW804

Push SW801 for approximately 1 sec.

The selected operation starts

LED D805 (green) flashes

Operation ends by:

- Pushing SW801 for 1 sec.
- Changing position of Dip switches
- Specified time of operation elapsed

| SW804 | Operation when pushdown button switch SW801 is pushed |
|---|---|
| | Refrigerant recovery operation<br>The outdoor unit performs cooling operation. The indoor unit does not work by this operation alone. Therefore operate the fan beforehand. |
| | Indoor cooling test run demand<br>The cooling test run is performed. (→ Note 1) |
| | Indoor heating test run demand<br>The heating test run is performed. (→ Note 1) |
| | Fan motor forced operation<br>Drive the fan motor forcedly.<br>When pushing SW801 again or when 2 minutes elapsed, the operation returns to the normal control. |
| | (No operation especially) |
| | PMV full open operation<br>Open PMV (Pulse Motor Valve) fully.<br>When pushing SW801 again or when 2 minutes elapsed, the operation returns to the normal control. |
| | PMV full close operation<br>Close PMV (Pulse Motor Valve) fully.<br>When pushing SW801 again or when 2 minutes elapsed, the operation returns to the normal control. |
| | PMV middle opening operation<br>Set PMV (Pulse Motor Valve) to middle opening (250 pulses).<br>When pushing SW801 again or when 2 minutes elapsed, the operation returns to the normal control. |
| | 4-way valve relay operation (For RY700, CN70 check)<br>Turn on 4-way valve power relay (RY700).<br>When pushing SW801 again or when 2 minutes elapsed, the operation returns to the normal control.<br>[NOTE]<br>In case of these models adopting the self hold valve, the coil develops fever. Therefore do not perform this operation as coil is connected. |
| | Self-hold valve suction operation (Exchange to heating cycle)<br>(For RY700 RY701, RY705, CN701 check)<br>Turn on relay RY700, RY701, RY705.<br>(CN701 between ① and ④ : Voltage=Approx. +198 to 380V)<br>This function works for 10 seconds and then is OFF. |
| | Self-hold valve separation operation (Exchange to cooling cycle)<br>Turn on relay RY700.<br>(CN701 between 1) and 4): Voltage=Approx. –198 to 380V)<br>This function works for 10 seconds and then is OFF. |

[NOTE]
Although these operations can be performed even during operation, basically perform operation while the unit stops.
If performing this operation during driving the unit, it is dangerous because the pressure may change suddenly.



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# Indoor Unit LED Display

## D501 (Red): Cassette, D02 (Red) Under Ceiling and High Walls

Turns on when power is supplied to unit
Flashes in 1 sec. interval when there is no EEPROM or writing in operation failed
Flashes in 10 sec. interval during DISP mode
Flashes in 2 sec. interval while setting of function

## D403 (Red) : Cassette, D203 (Red): Under Ceiling and High Walls

Turns on when power to remote control is turned on

## D504 (Green) Cassette only

Flashes 5 seconds in the first half communication with remote control
Flashes with 0.2 interval for 5 seconds in the latter half of the communication between header unit and follower in group control

## D14 (Orange): Cassette only

Flashes while receiving serial signal from the outdoor unit

## D15 (Green): Cassette only

Flashes while sending a serial signal from the outdoor unit

# Error Codes Displayed by Wired Remote Control (RBC-AMT32UL)

Error happen

↓

⚠Unit number and check code flash on the remote controller panel

↓

Operation lamp flash ( green lamp )

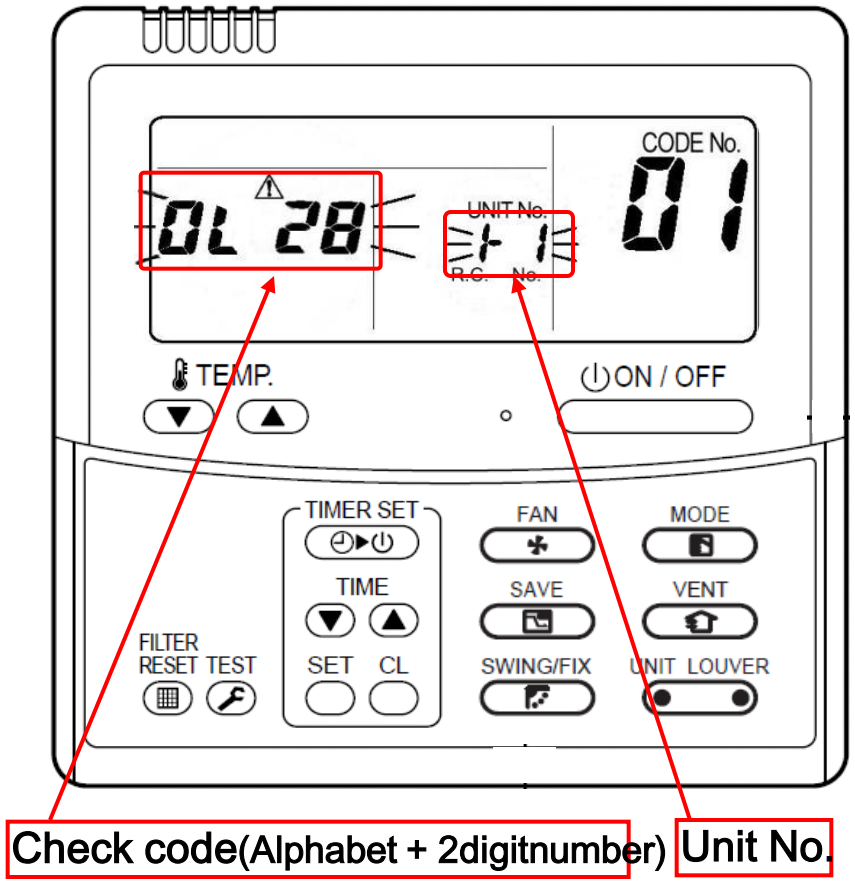
↓

According to the check code list, repair the error

==>Ref. service manual or quick reference card

**NOTE**

Simple remote controller ( RBC- AS21E ) can not display unit No.
Only check code is displayed.



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# Recalling of Error History

a. Push TEST + CL button simultaneously for more than 4 sec.

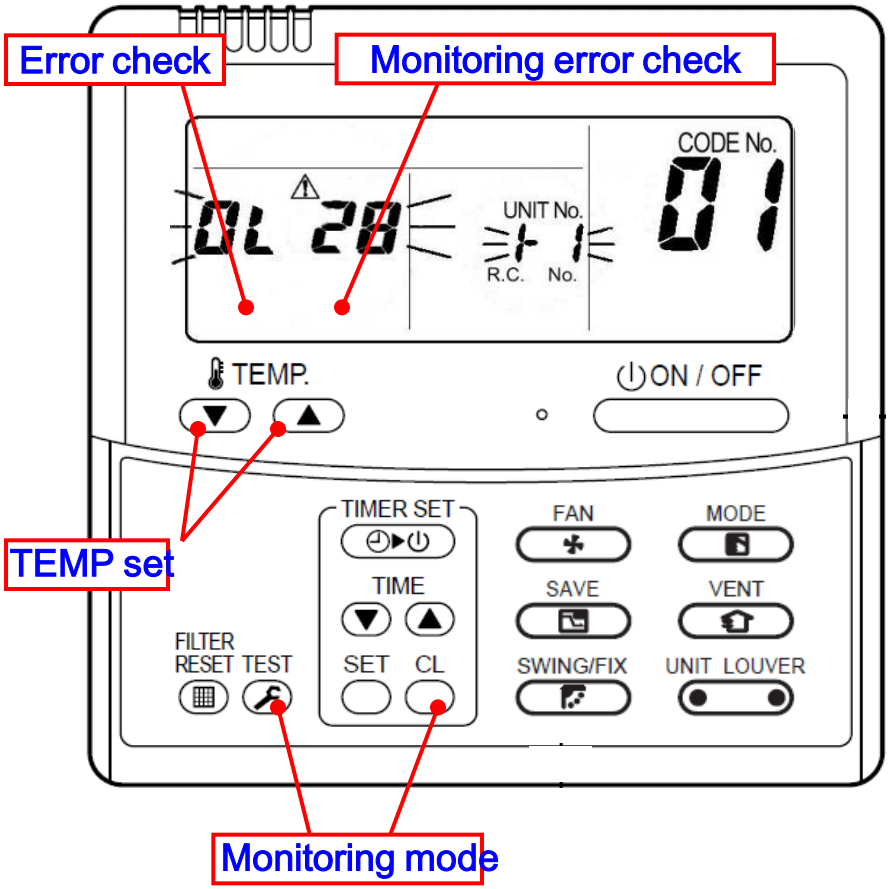
b. The latest error code is displayed with as DN code No."01"

c. Push " TEMP SET "button to check the 2nd ~ 4th

d. Push TEST button to get to a normal state.

This operation is only possible with a wired remote controller.

It cannot be applied to other remote control units.



# Error Codes Displayed by Receiver Board (RBC-AX31U(W)-UL)

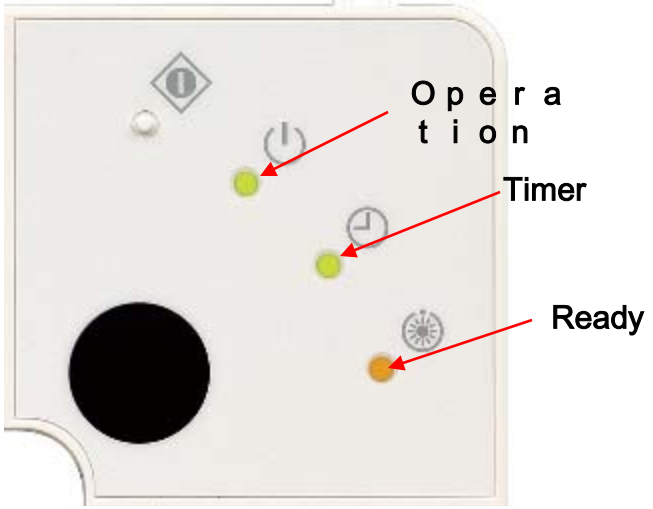
**Error happen**

↓

Check the LED of indoor display panel (Receiving part)

↓

According to the state of the three lamps, judge check code.
Refer service manual or quick reference card.
Repair the error place




● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

**NOTE**

Only rough diagnosis can be available by indoor unit lamp.

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ● Timer ● Ready ● No indication at all | — | Power supply OFF or miswiring between receiving unit and indoor unit |
| Operation ☼ Timer ● Ready ● Flash | E01 | Receiving error / Sending error / Communication stop } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E02 | |
| | E03 | |
| | E08 | Duplicated indoor unit No. / Duplicated master units of remote controller } Setup error |
| | E09 | |
| | E10 | Communication error between CPUs on indoor unit P.C. board |
| | E18 | Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor master and follower or between main and sub indoor twin) |



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# Error Codes Displayed by LED's On Outdoor Unit Board (RAV-SP240/300/360/420AT2-UL Models)

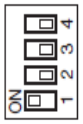
SW803: LED display by bit1 OFF and ON

### Dip switch setup

- When turning on 1) only of SW803, the latest error is displayed. As the memory is stored, it can be confirmed even if the power supply is turned off once. (excluding outside temp. sensor (TO) error)
- When the work finished or the outdoor temp. sensor (TO) error was found, turn off all of SW803. (The error which occurs at present is displayed.)

**<Latest error display>**

Only 1) of SW803 is ON.




**<Error display, which occurs at present)**

All SW803 are OFF. (Initial status)

### Display selection

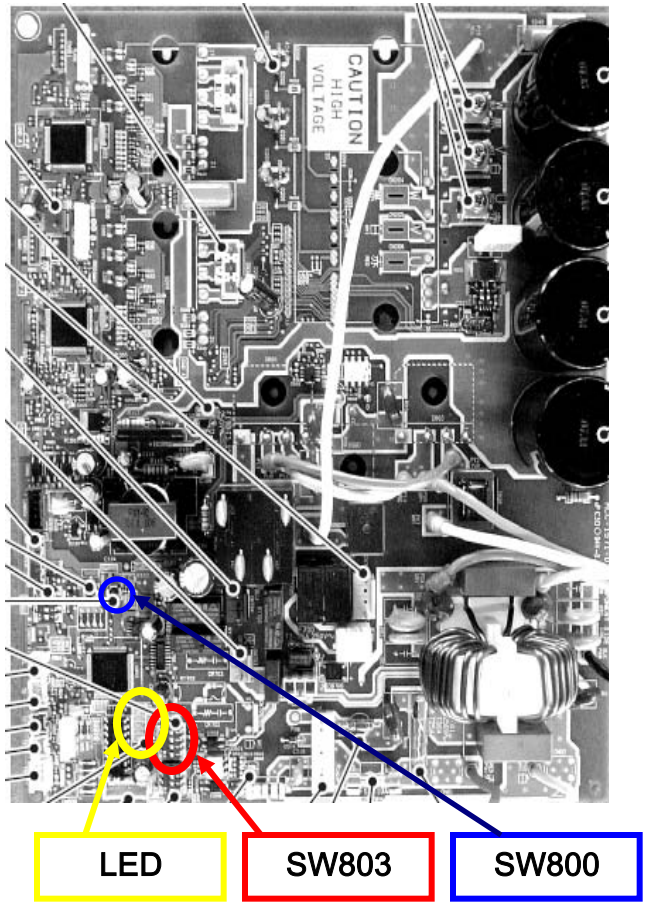
- When even a LED of D800 to D804 (Yellow) goes on, error occurrence is indicated. **<Display 1>**
- If pushing the button switch SW800 for 1 second under the above condition, the yellow LED is displayed with flashing. **<Display 2>**
- When pushing SW800 for 1 second again, the status returns to **<Display 1>**.
- The error contents can be confirmed by combining **<Display 1>** and **<Display 2>**.

**<Display 1> ⇔ <Display 2>**

| | (No error) | (Error occurred) | (Push SW800) |
|---|---|---|---|
| D800 (Yellow) | ● | ○ | ● |
| D801 (Yellow) | ● | ○ | ● |
| D802 (Yellow) | ● | ● | ◎ |
| D803 (Yellow) | ● | ● | ● |
| D804 (Yellow) | ● | ○ | ● |
| D805 (Green) | ○ | ○ | ○ |

(Example of discharge temp. sensor error)

● : Go off, ○ : Go on, ◎ : Flash



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TOSHIBA Carrier

# Error Codes Displayed by Indoor Unit (Caused by Indoor Unit)

| Operation of diagnostic function | | | | Judgment and measures |
|---|---|---|---|---|
| Check code | Cause of operation | Status of air conditioner | Condition | |
| E03 | No communication from remote controller (including wireless) and communication adapter | Stop (Automatic reset) | Displayed when error is detected | 1. Check wires of remote controller and communication adapters.<br>• Remote controller LCD display OFF (Disconnection)<br>• Central remote controller [97] check code |
| E04 | The serial signal is not output from outdoor unit to indoor unit.<br>• Miswiring of inter-unit wire<br>• Defective serial sending circuit on outdoor P.C. board<br>• Defective serial receiving circuit on indoor P.C. board | Stop (Automatic reset) | Displayed when error is detected | 1. Outdoor unit does not completely operate.<br>• Inter-unit wire check, correction of miswiring<br>• Check outdoor P.C. board. Correct wiring of P.C. board.<br>• Check case tharmostat operation. (SP180 only)<br>2. When outdoor unit normally operates<br>Check P.C. board (Indoor receiving / Outdoor sending). |
| E08 | Duplicated indoor unit address | Stop | Displayed when error is detected | 1. Check whether remote controller connection (Group/Individual) was changed or not after power supply turned on (Finish of group construction/Address check).<br>* If group construction and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address) |
| L03 | Duplicated indoor header unit | | | |
| L07 | There is group wire in individual indoor unit. | | | |
| L08 | Unset indoor group address | | | |
| L09 | Unset indoor capacity | Stop | Displayed when error is detected | 1. Set indoor capacity (DN=11) |



Back to main menu  Back to Service

# Error Codes Displayed by Indoor Unit (Caused by Indoor Unit) - Continued

| Operation of diagnostic function | | | | Judgment and measures |
|---|---|---|---|---|
| Check code | Cause of operation | Status of air conditioner | Condition | |
| P10 | Float switch operation<br>• Float circuit, Disconnection, Coming-off, Float switch contact error | Stop | Displayed when error is detected | 1. Trouble of drain pump<br>2. Clogging of drain pump<br>3. Check float switch.<br>4. Check indoor P.C. board. |
| P12 | Indoor DC fan error | Stop | Displayed when error is detected | 1. Position detection error<br>2. Over-current protective circuit of indoor fan driving unit operated.<br>3. Indoor fan locked.<br>4. Check indoor P.C. board. |
| P19 | 4-way valve system error<br>• After heating operation has started, indoor heat exchangers temp. is down. | Stop (Automatic reset) | Displayed when error is detected | 1. Check 4-way valve.<br>2. Check 2-way valve and check valve.<br>3. Check indoor heat exchanger (TC/TCJ).<br>4. Check indoor P.C. board. |
| P31 | Own unit stops while warning is output to other indoor units. | Stop (Follower unit) (Automatic reset) | Displayed when error is detected | 1. Judge follower unit while header unit is [E03], [L03], [L07] or [L08].<br>2. Check indoor P.C. board. |
| F01 | Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TCJ) | Stop (Automatic reset) | Displayed when error is detected | 1. Check indoor heat exchanger temp. sensor (TCJ).<br>2. Check indoor P.C. board. |
| F02 | Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TC) | Stop (Automatic reset) | Displayed when error is detected | 1. Check indoor heat exchanger temp. sensor (TC).<br>2. Check indoor P.C. board. |
| F10 | Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TA) | Stop (Automatic reset) | Displayed when error is detected | 1. Check indoor heat exchanger temp. sensor (TA).<br>2. Check indoor P.C. board. |

# Error Codes Displayed by Indoor Unit (Caused by Indoor Unit) - Continued

| Operation of diagnostic function | | | | Judgment and measures |
|---|---|---|---|---|
| Check code | Cause of operation | Status of air conditioner | Condition | |
| F29 | Indoor EEPROM error<br>• EEPROM access error | Stop (Automatic reset) | Displayed when error is detected | 1. Check indoor EEPROM. (including socket insertion)<br>2. Check indoor P.C. board. |
| E10 | Communication error between indoor MCU<br>• Communication error between fan driving MCU and main MCU | Stop (Automatic reset) | Displayed when error is detected | 1. Check indoor P.C. board. |
| E18 | Regular communication error between indoor header and follower units and between main and sub units | Stop (Automatic reset) | Displayed when error is detected | 1. Check remote controller wiring.<br>2. Check indoor power supply wiring.<br>3. Check indoor P.C. board. |

# Error Codes Displayed by Indoor Unit (Caused by Outdoor Unit)

| Operation of diagnostic function | | | | | Judgment and measures |
|---|---|---|---|---|---|
| Check code | | Cause of operation | Status of air conditioner | Condition | |
| Indoor unit | | | | | |
| Under Ceiling | 4-Way High Wall | | | | |
| F04 | F04 | Disconnection, short of discharge temp. sensor (TD) | Stop | Displayed when error is detected | 1. Check discharge temp. sensor (TD).<br>2. Check outdoor P.C. board. |
| F06 | F06 | Disconnection, short of outdoor temp. sensor (TE) | Stop | Displayed when error is detected | 1. Check temp. sensor (TE).<br>2. Check outdoor P.C. board. |
| | F07 | Disconnection, short of outdoor temp. sensor (TL) | Stop | Displayed when error is detected | 1. Check temp. sensor (TL).<br>2. Check outdoor P.C. board. |
| | F12 | Disconnection, short of suction temp. sensor (TS) | Stop | Displayed when error is detected | 1. Check suction temp. sensor (TS).<br>2. Check outdoor P.C. board. |
| | F15 | Miss-mounting of outdoor temp. sensor (TE, TS) | Stop | Displayed when error is detected | 1. Check temp. sensor (TE, TS).<br>2. Check outdoor P.C. board. |
| F08 | F08 | Disconnection, short of outside temp. sensor (TO) | Continue | Displayed when error is detected | 1. Check outside temp. sensor (TO).<br>2. Check outdoor P.C. board. |

# Error Codes Displayed by Indoor Unit (Caused by Outdoor Unit) - Continued

| Operation of diagnostic function | | | | | Judgment and measures |
|---|---|---|---|---|---|
| Check code / Indoor unit | | Cause of operation | Status of air conditioner | Condition | |
| Under Ceiling | 4-Way High Wall | | | | |
| L29 | F13 | Disconnection, short of heat sink temp. sensor (TH) | Stop | Displayed when error is detected | 1. Check outdoor P.C. board. |
| | F31 | Outdoor P.C. EEPROM error | Stop | Displayed when error is detected | 1. Check outdoor P.C. board. |
| | L10 | Unset jumper of service P.C. board | Stop | Displayed when error is detected | 1. Outdoor service P.C. board<br>Check model type setting jumper wire. |
| | L29 | Communication error between outdoor P.C. board MCU | Stop | Displayed when error is detected | 1. Check outdoor P.C. board. |
| | P07 | Heat sink overheat error<br>* Heat sink temp. sensor detected over specified temperature. | Stop | Displayed when error is detected | 1. Check screw tightening between PC. Board and heat sink and check radiator grease.<br>2. Check heat sink blast path. |
| | P15 | Detection of gas leak<br>* Discharge temp. sensor (TD), Suction temp. sensor (TS) detected temperature over specified temp. | Stop | Displayed when error is detected | 1. Check gas leak, recharge<br>2. Check full open of service valve.<br>3. Check PMV (Pulse Motor Valve).<br>4. Check broken pipe.<br>5. Check discharge temp. sensor (TD), suction temp. sensor (TS). |
| | P19 | 4-way valve inverse error<br>* After heating operation has started, indoor heat exchanger temp. lowers under the specified temp.<br>* After heating operation has started, outdoor heat exchanger / suction temp. rises over the specified temp. | Stop | Displayed when error is detected | 1. Check operation of 4-way valve.<br>2. Check outdoor heat exchanger (TE), suction temp. sensor (TS).<br>3. Check indoor heat exchanger sensor (TC).<br>4. Check 4-way valve coil.<br>5. Check PMV (Pulse Motor Valve). |

# Error Codes Displayed by Indoor Unit (Caused by Outdoor Unit) - Continued

| Operation of diagnostic function | | | | | Judgment and measures |
|---|---|---|---|---|---|
| Check code | | Cause of operation | Status of air conditioner | Condition | |
| Indoor unit | | | | | |
| Under Ceiling | 4-Way High Wall | | | | |
| H01 | H01 | Compressor break down<br>* Although operation has started, operation frequency decreases and operation stops. | Stop | Displayed when error is detected | 1. Check power supply voltage. (AC187, 253V)<br>2. Overload operation of refrigerating cycle.<br>3. Wiring error of compressor (Open phase) |
| H02 | H02 | Compressor lock<br>* Over-current detection after compressor start-up | Stop | Displayed when error is detected | 1. Trouble of compressor (Lock, etc.): Replace compressor.<br>2. Wiring error of compressor (Open phase) |
| H03 | H03 | Current detection circuit error | Stop | Displayed when error is detected | 1. Check outdoor P.C. board. (AC current detection circuit) |
| P03 | P03 | Discharge temp. error<br>* Discharge temp. (TD) over specified value was detected. | Stop | Displayed when error is detected | 1. Check refrigerating cycle (Gas leak)<br>2. Trouble of electronic expansion valve<br>3. Check discharge temp. sensor (TD). |

# Error Codes Displayed by Indoor Unit (Caused by Outdoor Unit) - Continued

| Operation of diagnostic function | | | | | Judgment and measures |
|---|---|---|---|---|---|
| Check code | | Cause of operation | Status of air conditioner | Condition | |
| Indoor unit | | | | | |
| Under Ceiling | 4-Way High Wall | | | | |
| P04 | H04 | Case thermostat operation<br>* Abnormal overheat of compressor | Stop | Displayed when error is detected | 1. Check case thermostat and connector.<br>2. Check gas leak, recharge<br>3. Check full open of service valve.<br>4. Check PMV (Pulse Motor Valve).<br>5. Check broken pipe. |
| | P04 | High-pressure SW error | Stop | Displayed when error is detected | • Check full-open of service valve.<br>• Check outdoor fan error.<br>• Check outdoor fan motor error.<br>• Check clogging of outdoor PMV.<br>• Check loading of indoor/outdoor heat exchangers.<br>• Short-circuit of outdoor discharge/suction air<br>• Check outdoor P.C. board (I/F) error.<br>• Check error of fan system (air volume drop) at indoor side.<br>• Check miswiring of communication line between indoor and outdoor.<br>• Check overcharge of refrigerant. |
| | P05 | Power supply voltage error | Stop | Displayed when error is detected | 1. Check power supply voltage. AC198 to 253V |
| | P20 | High pressure protective operation<br>• During cooling operation, outdoor temp. sensor (TL) detected temperature over specified temp.<br>• During heating operation, indoor temp. sensor (TC, TCJ) detected temperature over specified temp. | Stop | Displayed when error is detected | 1. Check outdoor heat exchanger sensor (TL).<br>2. Check indoor heat exchanger sensor (TC, TCJ).<br>3. Check full open of service valve.<br>4. Check indoor/outdoor fan.<br>5. Check PMV (Pulse Motor Valve).<br>6. Check clogging and short circuit of indoor/outdoor heat exchanger.<br>7. Overcharge of refrigerant. Recharge |

# Error Codes Displayed by Indoor Unit (Caused by Outdoor Unit) - Continued

| Operation of diagnostic function | | | | | |
|---|---|---|---|---|---|
| Check code / Indoor unit | | Cause of operation | Status of air conditioner | Condition | Judgment and measures |
| Under Ceiling | 4-Way High Wall | | | | |
| P22 | P22 | Outdoor fan system error | Stop | Displayed when error is detected | 1. Check lock of fan motor.<br>2. Check power supply voltage. AC198 to 253V<br>3. Check outdoor P.C. board. |
| P26 | P26 | Short-circuit error of compressor driving element | Stop | Displayed when error is detected | 1. When performing operation while taking-off compressor wire, P26 error occurs. Check control P.C. board.<br>2. When performing operation while taking-off compressor wire, an error does not occur. (Compressor rare short) |
| P29 | P29 | Position detection circuit error | Stop | Displayed when error is detected | 1. Check control P.C. board. |

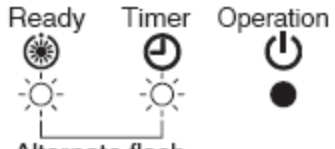
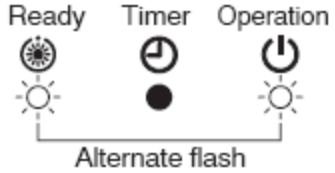
# Trouble Shooting High Wall Units

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Ready ● Timer ● Operation ●<br>No indication at all | — | Power supply OFF or miswiring between receiving unit and indoor unit |
| Ready ● Timer ● Operation ☼<br>Flash | E01 | Receiving error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E02 | Sending error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E03 | Communication stop } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E08 | Duplicated indoor unit No. } Setup error |
| | E09 | Duplicated master units of remote controller } Setup error |
| | E10 | Communication error between CPUs on indoor unit P.C. board |
| | E18 | Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor master and follower or between main and sub indoor twin) |
| Ready ☼ Timer ● Operation ●<br>Flash | E04 | Miswiring between indoor unit and outdoor unit or connection erorr (Communication stop between indoor and outdoor units) |

# Trouble Shooting High Wall Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
|  | P01 | Indoor AC fan error — Protective device of indoor unit worked. |
| | P10 | Overflow was detected. — Protective device of indoor unit worked. |
| | P12 | Indoor DC fan error — Protective device of indoor unit worked. |
|  | P03 | Outdoor unit discharge temp. error<br>Outdoor high pressure system error<br>Case thermostat worked<br>Power supply error — Protective device of outdoor unit worked. *1 |
| | P04 | |
| | P05 | Power supply error — Outdoor unit error |
| | P07 | Heat sink overheat error — Outdoor unit error |
| | P15 | Gas leak detection error — Outdoor unit error |
| | P19 | 4-way valve system error (Indoor or outdoor unit judged.) |
| | P20 | Outdoor unit high pressure protection |
| | P22 | Outdoor unit: Outdoor unit error — Protective device of outdoor unit worked. *1 |
| | P26 | Outdoor unit: Inverter Idc operation — Protective device of outdoor unit worked. *1 |
| | P29 | Outdoor unit: Position detection error — Protective device of outdoor unit worked. *1 |
| | P31 | Stopped because of error of other indoor unit in a group (Check codes of E03/L03/L07/L08) |

# Trouble Shooting High Wall Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence | |
|---|---|---|---|
| Ready ● Timer ☼ Operation ☼ (Alternate flash) | F01 | Heat exchanger sensor (TCJ) error | Indoor unit sensor error |
| | F02 | Heat exchanger sensor (TC) error | |
| | F10 | Heat exchanger sensor (TA) error | |
| Ready ○ Timer ☼ Operation ☼ (Alternate flash) | F04 | Discharge temp. sensor (TD) error | Sensor error of outdoor unit ∗1 |
| | F06 | Temp. sensor (TL, TS, TE) error | |
| | F07 | Temp. sensor (TD) error | |
| | F08 | Temp. sensor (TO) error | |
| | F12 | Temp. sensor (TS) error | |
| | F13 | Heat sink sensor (TH) error | |
| | F15 | Temp. sensor miswiring (TE, TS) | |
| Ready ● Timer ☼ Operation ☼ (Simultaneous flash) | F29 | Indoor EEPROM error | |
| Ready ○ Timer ☼ Operation ☼ (Simultaneous flash) | F31 | Outdoor EEPROM error | |

# Trouble Shooting High Wall Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Ready ● Timer ☼ Flash Operation ● | H01 | Compressor break down } Outdoor compressor system error *1 |
| | H02 | Compressor lock |
| | H03 | Current detection circuit error } Power supply, outdoor P.C. board error |
| | H04 | Case thermostat worked. } Compressor overheat, outdoor wiring error |
| Ready ☼ Timer ● Operation ☼ Simultaneous flash | L03 | Duplicated master indoor units → AUTO address<br>* If group construction and address are not normal when power supply turned on, automatically goes to address setup mode. |
| | L07 | There is indoor unit of group connection in individual indoor unit. |
| | L08 | Unsetting of group address |
| | L09 | Missed setting (Unset indoor capacity) |
| Ready ☼ Timer ○ Operation ☼ Simultaneous flash | L10 | Unset model type (Service board) |
| | L20 | Duplicated indoor central addresses |
| | L29 | Temp. sensor (TH) error<br>EEPROM error<br>Communication between outdoor MCU<br>Heat sink overheat error<br>Gas leak detection error<br>4-way valve error |
| | L30 | Outside interlock error |

# Trouble Shooting High Wall Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Ready Timer Operation<br> <br>Simultaneous flash | — | During test run |

# Trouble Shooting Cassette and Under Ceiling Units

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ● Timer ● Ready ● No indication at all | — | Power supply OFF or miswiring between receiving unit and indoor unit |
| Operation ☼ Flash Timer ● Ready ● | E01 | Receiving error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E02 | Sending error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E03 | Communication stop } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E08 | Duplicated indoor unit No. } Setup error |
| | E09 | Duplicated master units of remote controller } Setup error |
| | E10 | Communication error between CPUs on indoor unit P.C. board |
| | E18 | Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor header and follower) |
| Operation ● Timer ● Ready ☼ Flash | E04 | Miswiring between indoor unit and outdoor unit or connection erorr (Communication stop between indoor and outdoor units) |
| Operation ● Timer ☼ Ready ☼ Alternate flash | P10 | Overflow was detected. } Protective device of indoor unit worked. |
| | P12 | Indoor DC fan error } Protective device of indoor unit worked. |

# Trouble Shooting Cassette and Under Ceiling Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ☼ Timer ● Ready ☼<br>Alternate flash | P03 | Outdoor unit discharge temp. error<br>Outdoor high pressure system error<br>} Protective device of outdoor unit worked. *1 |
| | P04 | |
| | P05 | Negative phase detection error<br>Heat sink overheat error<br>Gas leak detection error<br>} Outdoor unit error |
| | P07 | |
| | P15 | |
| | P19 | 4-way valve system error (Indoor or outdoor unit judged.) |
| | P20 | Outdoor unit high pressure protection |
| | P22 | Outdoor unit: Outdoor unit error<br>Outdoor unit: Inverter Idc operation<br>Outdoor unit: Position detection error<br>} Protective device of outdoor unit worked. *1 |
| | P26 | |
| | P29 | |
| | P31 | Stopped because of error of other indoor unit in a group (Check codes of E03/L03/L07/L08) |

# Trouble Shooting Cassette and Under Ceiling Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ☼ Timer ☼ Ready ● Alternate flash | F01 | Heat exchanger sensor (TCJ) error |
| | F02 | Heat exchanger sensor (TC) error |
| | F10 | Heat exchanger sensor (TA) error — Indoor unit sensor error |
| Operation ☼ Timer ☼ Ready ○ Alternate flash | F04 | Discharge temp. sensor (TD) error |
| | F06 | Temp. sensor (TE) error |
| | F07 | Temp. sensor (TL) error |
| | F08 | Temp. sensor (TO) error |
| | F12 | Temp. sensor (TS) error |
| | F13 | Temp. sensor (TH) error |
| | F15 | Temp. Sensor miswiring (TE, TS) — Sensor error of outdoor unit *1 |
| Operation ☼ Timer ☼ Ready ● Simultaneous flash | F29 | Indoor EEPROM error |
| Operation ☼ Timer ☼ Ready ○ Simultaneous flash | F31 | Outdoor EEPROM error |

# Trouble Shooting Cassette and Under Ceiling Units - Continued

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

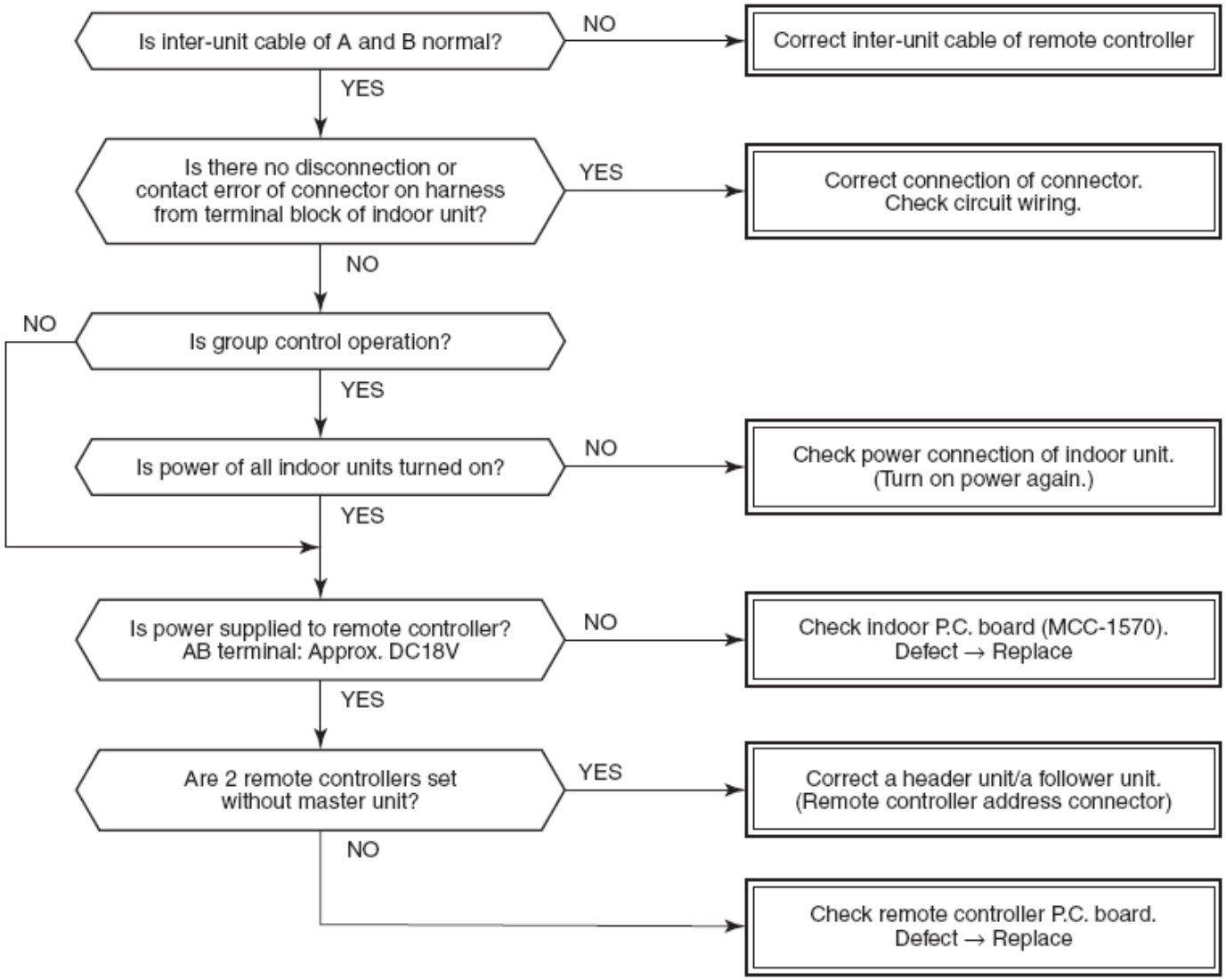
| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ● Timer ☼ Flash Ready ● | H01 | Compressor break down<br>Compressor lock<br>Current detection circuit error<br>Case thermostat worked. } Outdoor compressor system error *1 |
| | H02 | |
| | H03 | |
| | H04 | |
| | H06 | Outdoor unit low pressure system error |
| Operation ☼ Timer ● Ready ☼ Simultaneous flash | L03 | Duplicated master indoor units<br>There is indoor unit of group connection in individual indoor unit.<br>Unsetting of group address } → AUTO address<br>* If group construction and address are not normal when power supply turned on, automatically goes to address setup mode. |
| | L07 | |
| | L08 | Missed setting (Unset indoor capacity) |
| | L09 | |
| Operation ☼ Timer ○ Ready ☼ Simultaneous flash | L10 | Unset model type (Service board)<br>Duplicated indoor central addresses<br>Outdoor unit and other error<br>Outside interlock error<br>Negative phase error } Others |
| | L20 | |
| | L29 | |
| | L30 | |
| | L31 | |

# Trouble Shooting Cassette and Under Ceiling Units - Continued

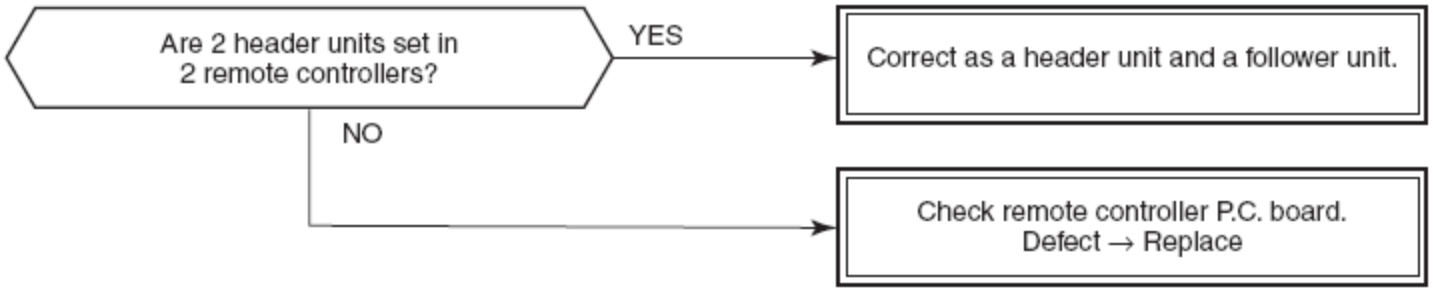
● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Operation ☼ Timer ☼ Ready ☼<br>Simultaneous flash | — | During test run |

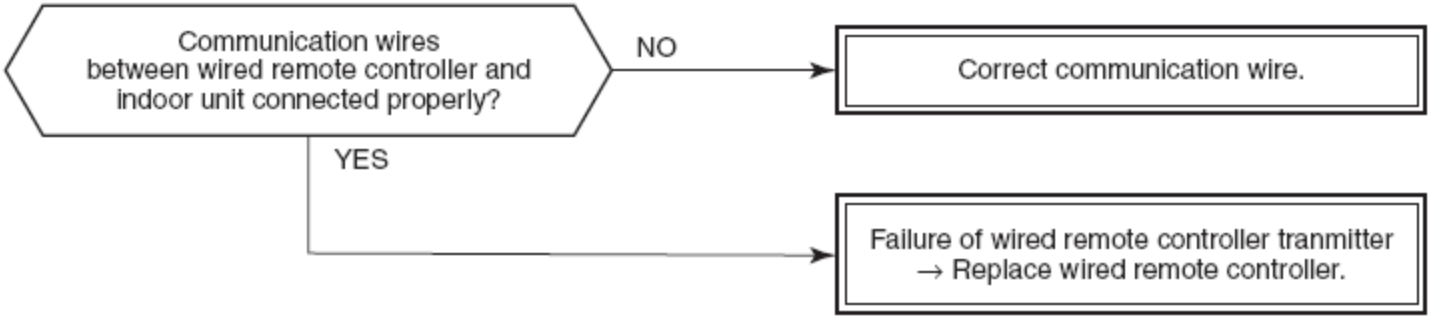
# All Units Diagnostic Flow Charts – [E01] Error


Is inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit wiring.
NO
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
Check power connection of indoor unit. (Turn on power again.)
YES
Is power supplied to remote controller? AB terminal: Approx. DC18V
NO
Check indoor P.C. board (MCC-1570). Defect → Replace
YES
Are 2 remote controllers set without master unit?
YES
Correct a header unit/a follower unit. (Remote controller address connector)
NO
Check remote controller P.C. board. Defect → Replace

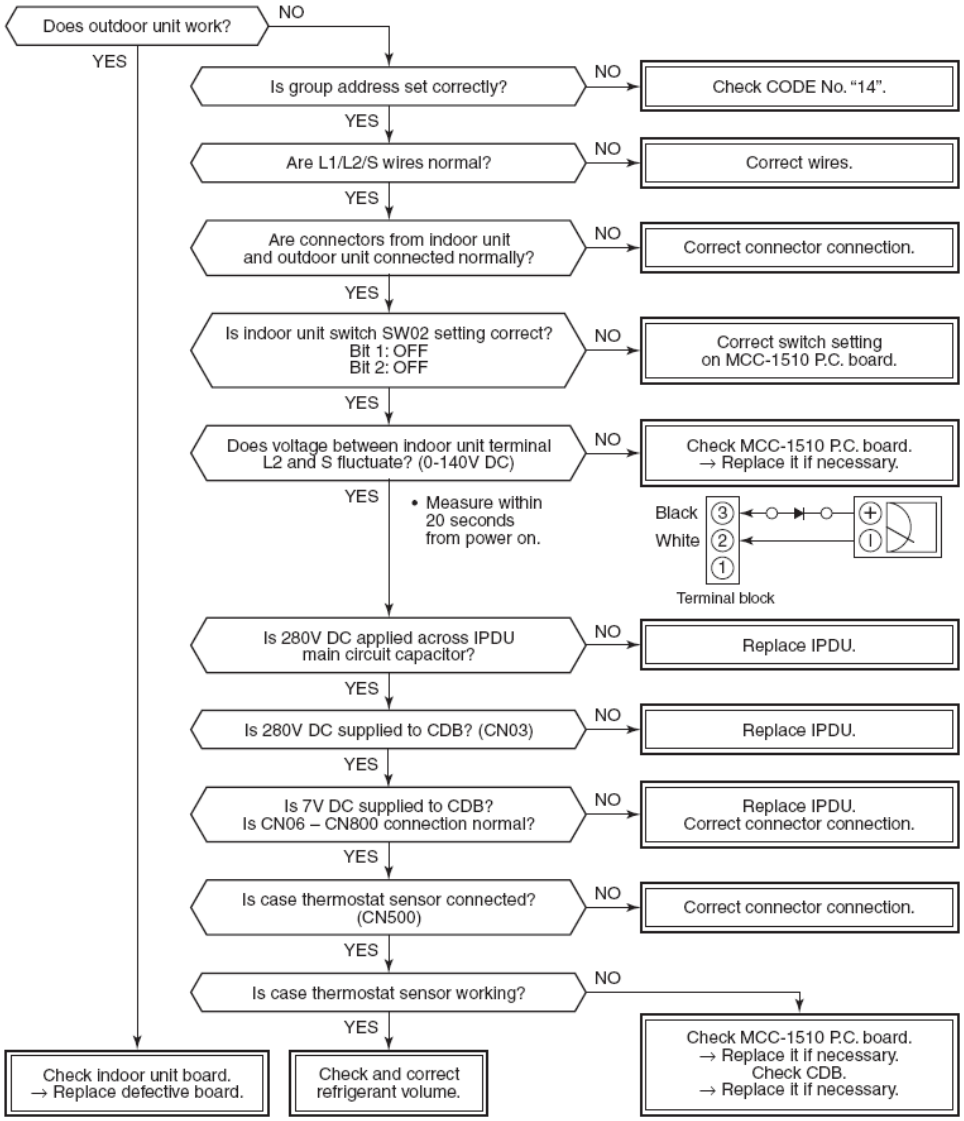
# All Units Diagnostic Flow Charts – [E09] Error


Are 2 header units set in 2 remote controllers?
YES
Correct as a header unit and a follower unit.
NO
Check remote controller P.C. board.
Defect → Replace

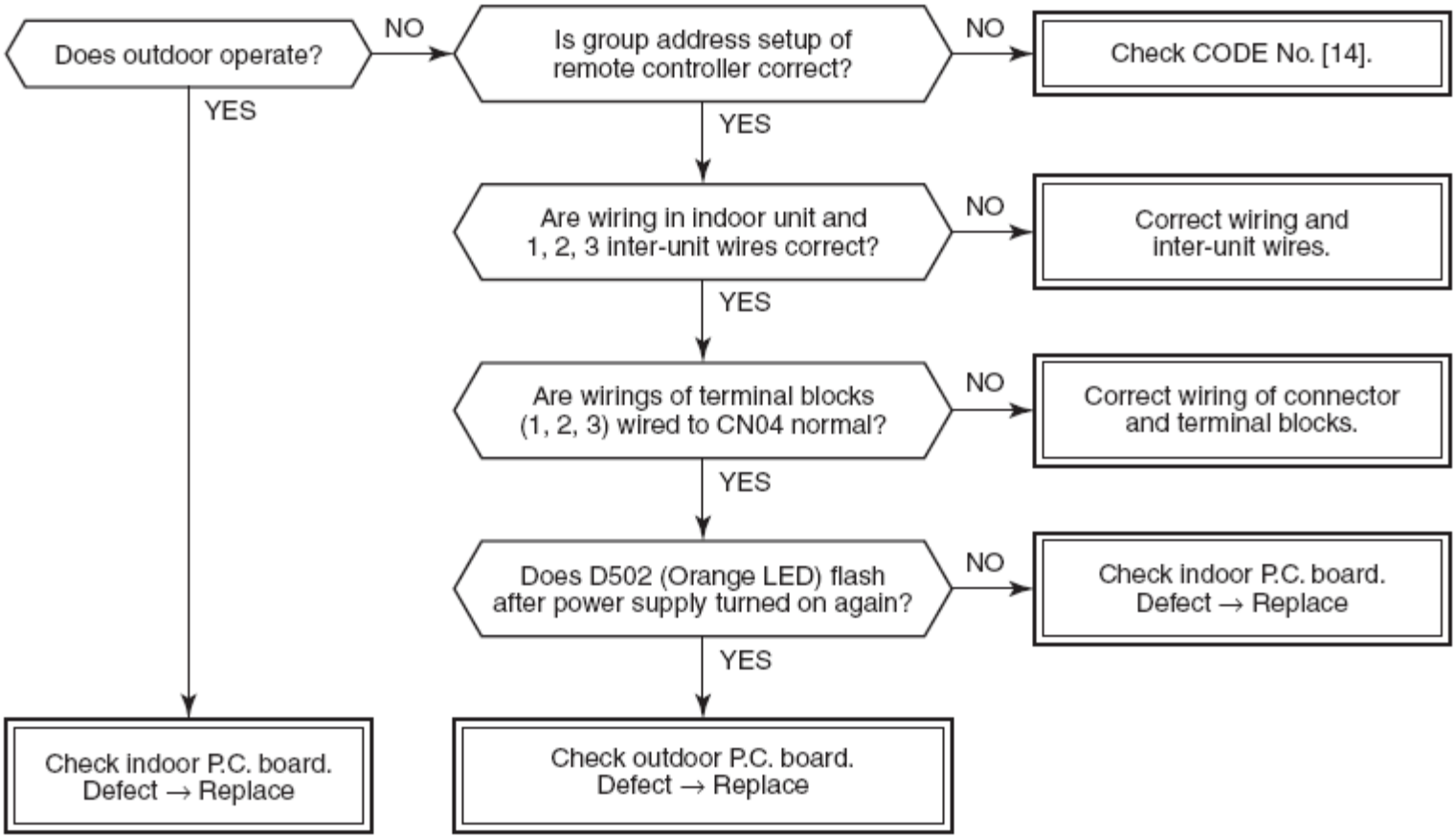
# All Units Diagnostic Flow Charts – [E02] Error


Communication wires between wired remote controller and indoor unit connected properly?
NO
Correct communication wire.
YES
Failure of wired remote controller tranmitter → Replace wired remote controller.

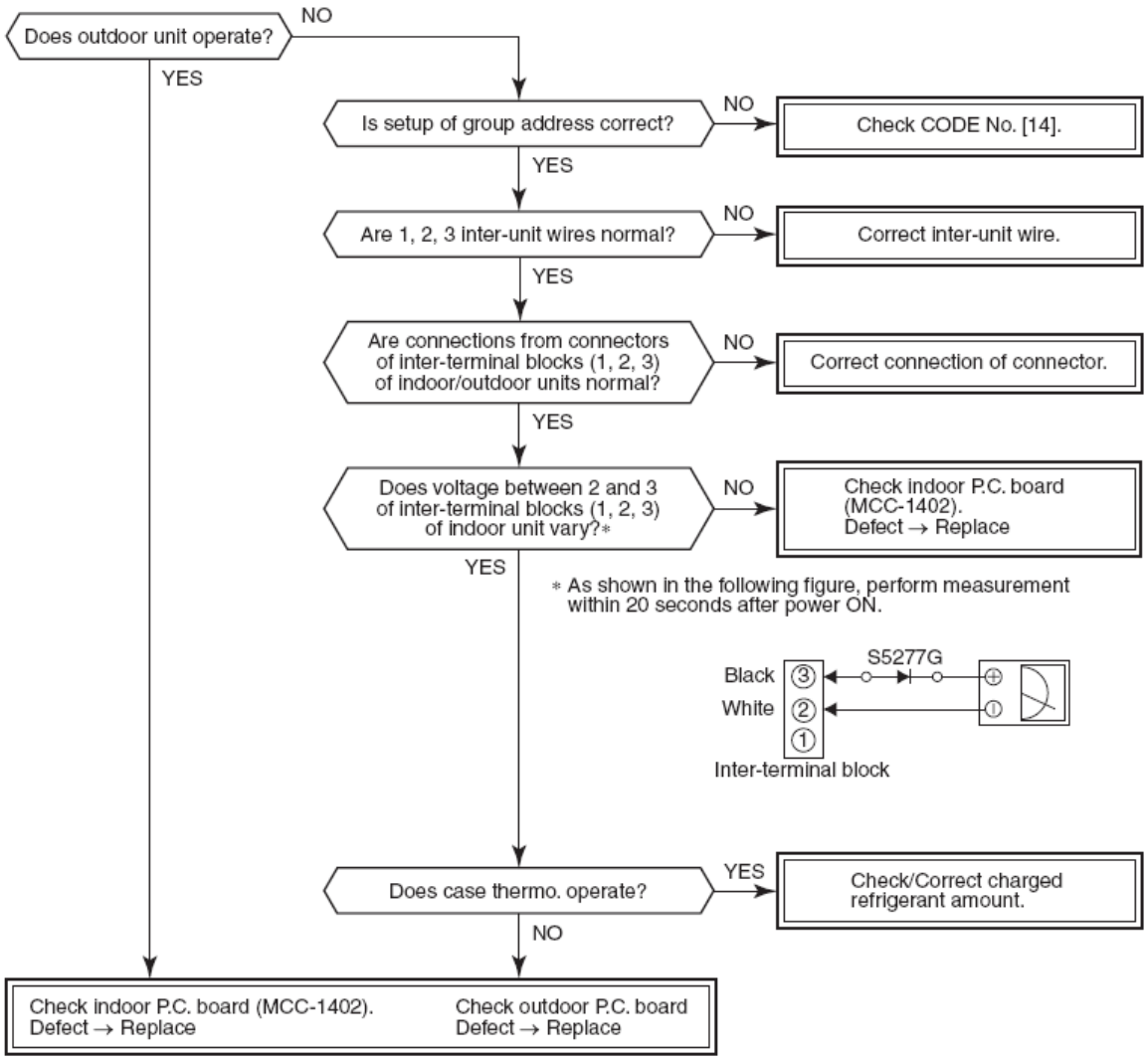
# High Wall Diagnostic Flow Charts – [E04] Error



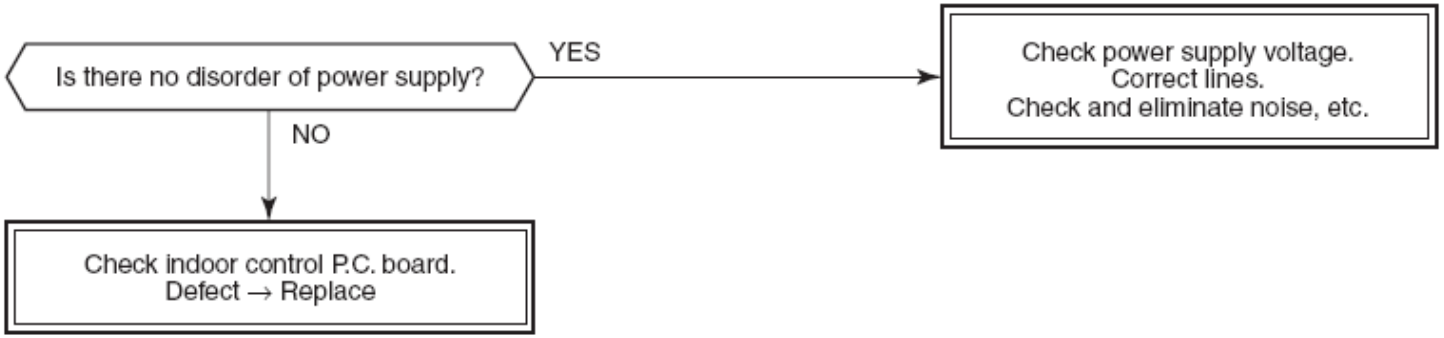
# Cassette Diagnostic Flow Charts – [E04] Error


Does outdoor operate?
NO
YES
Is group address setup of remote controller correct?
NO
Check CODE No. [14].
YES
Are wiring in indoor unit and 1, 2, 3 inter-unit wires correct?
NO
Correct wiring and inter-unit wires.
YES
Are wirings of terminal blocks (1, 2, 3) wired to CN04 normal?
NO
Correct wiring of connector and terminal blocks.
YES
Does D502 (Orange LED) flash after power supply turned on again?
NO
Check indoor P.C. board. Defect → Replace
YES
Check indoor P.C. board. Defect → Replace
Check outdoor P.C. board. Defect → Replace

# Under Ceiling Diagnostic Flow Charts – [E04] Error



# All Units Diagnostic Flow Charts – [E10] Error




# All Units Diagnostic Flow Charts – [E08, L03, L07, L08] Error

E08: Duplicated indoor unit No.

L03: There are 2 or more master units in a group control.

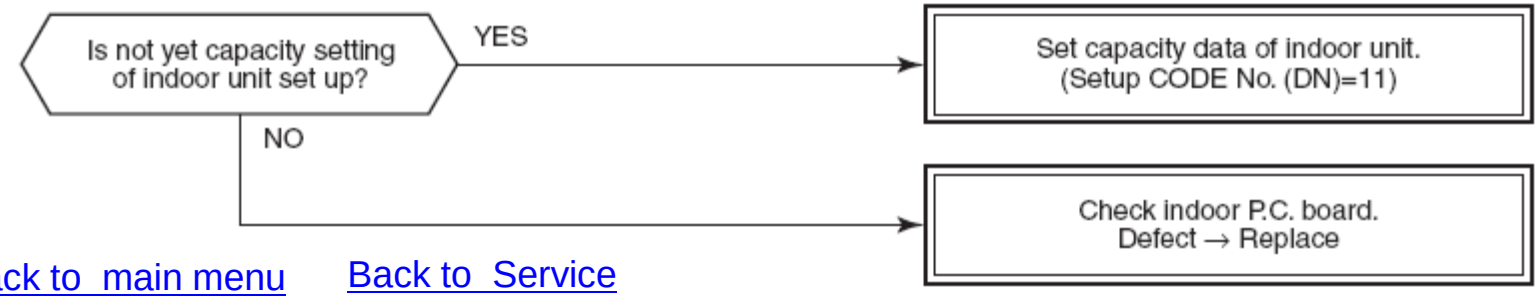
L07: There is 1 or more group address [Individual] in a group control.

L08: The indoor group address is unset. (**11. ADDRESS SETUP**)

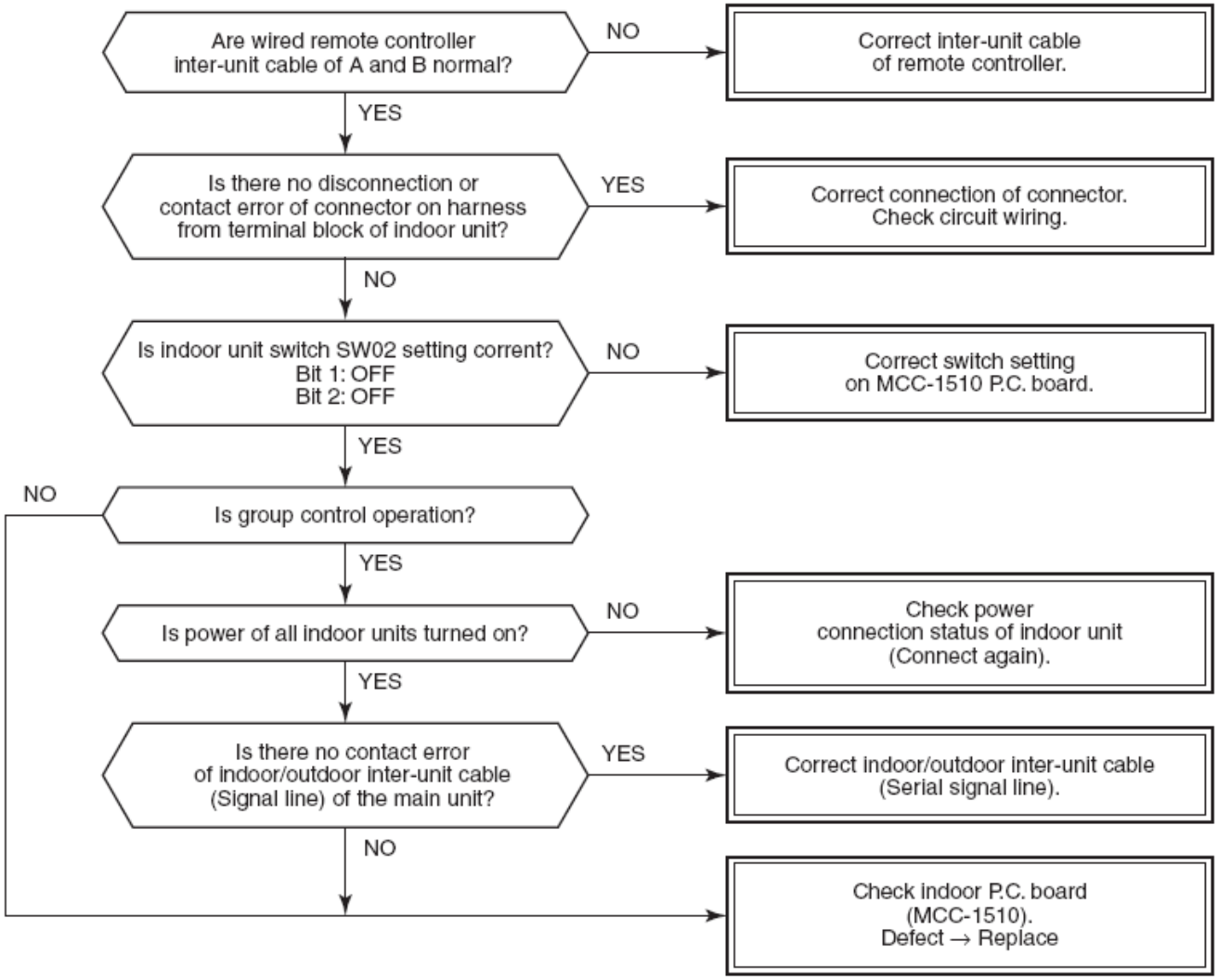
If the above error is detected when power supply turned on, the mode enters automatically in the automatic address set mode. (Check code is not output.)

However, if the above error is detected during the automatic address set mode, a check code may be output.

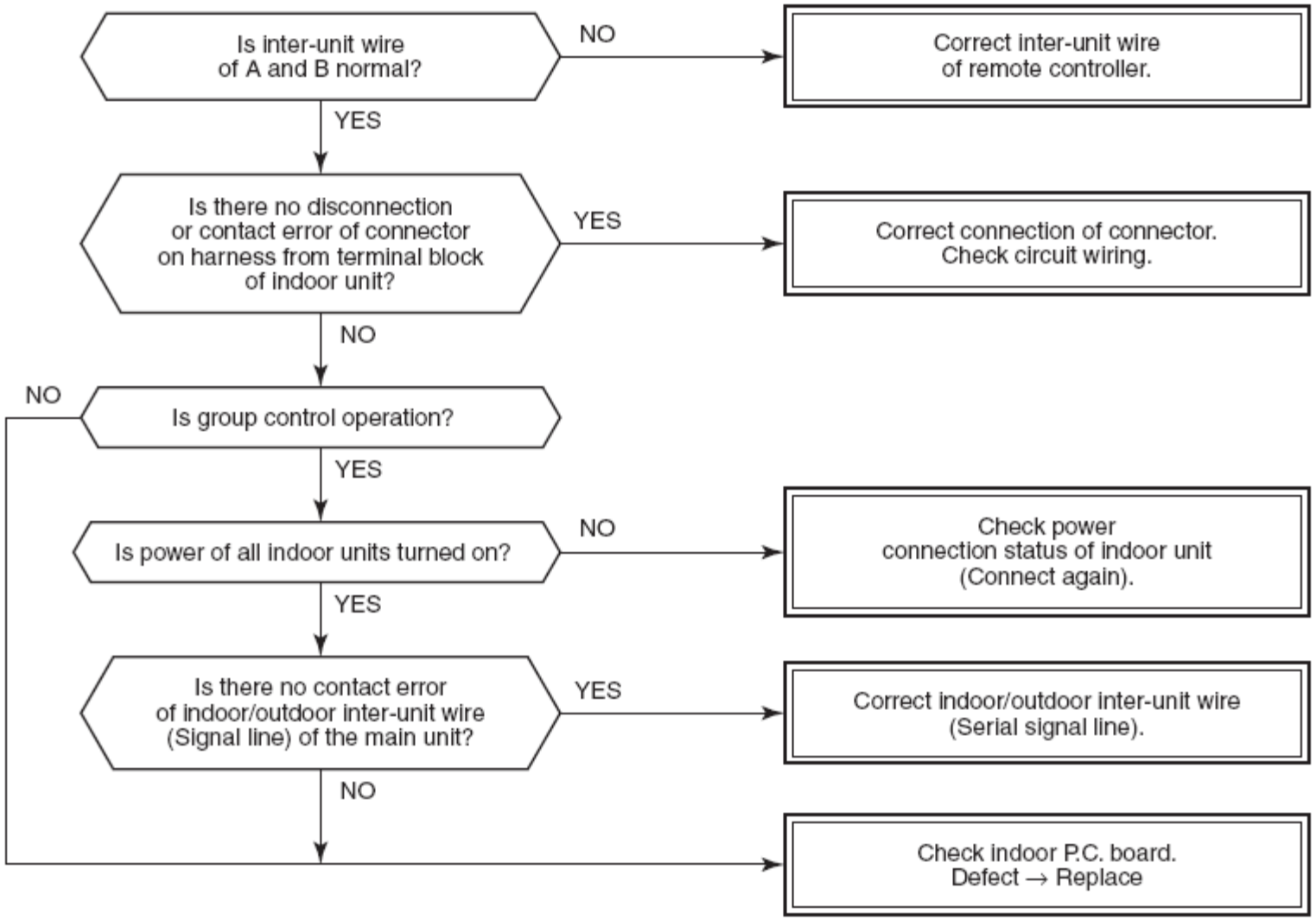
# All Units Diagnostic Flow Charts – [L09] Error


Is not yet capacity setting of indoor unit set up?
YES
Set capacity data of indoor unit.
(Setup CODE No. (DN)=11)
NO
Check indoor P.C. board.
Defect → Replace

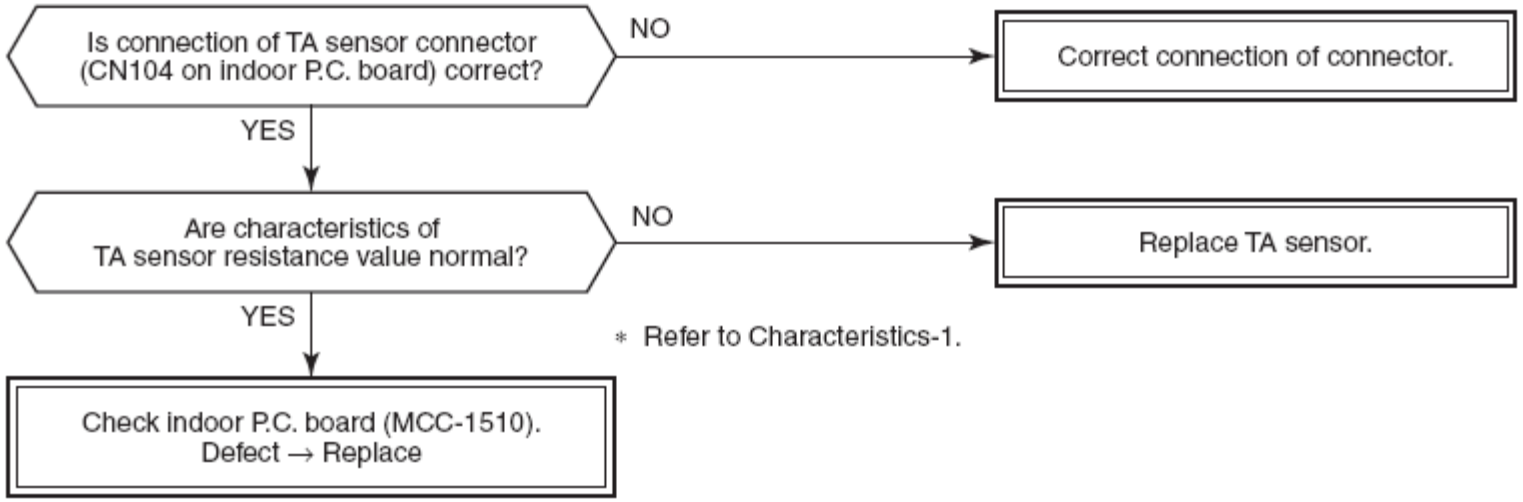
# High Wall Diagnostic Flow Charts – [E18] Error


Are wired remote controller inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit wiring.
NO
Is indoor unit switch SW02 setting corrent? Bit 1: OFF Bit 2: OFF
NO
Correct switch setting on MCC-1510 P.C. board.
YES
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
Check power connection status of indoor unit (Connect again).
YES
Is there no contact error of indoor/outdoor inter-unit cable (Signal line) of the main unit?
YES
Correct indoor/outdoor inter-unit cable (Serial signal line).
NO
Check indoor P.C. board (MCC-1510). Defect → Replace

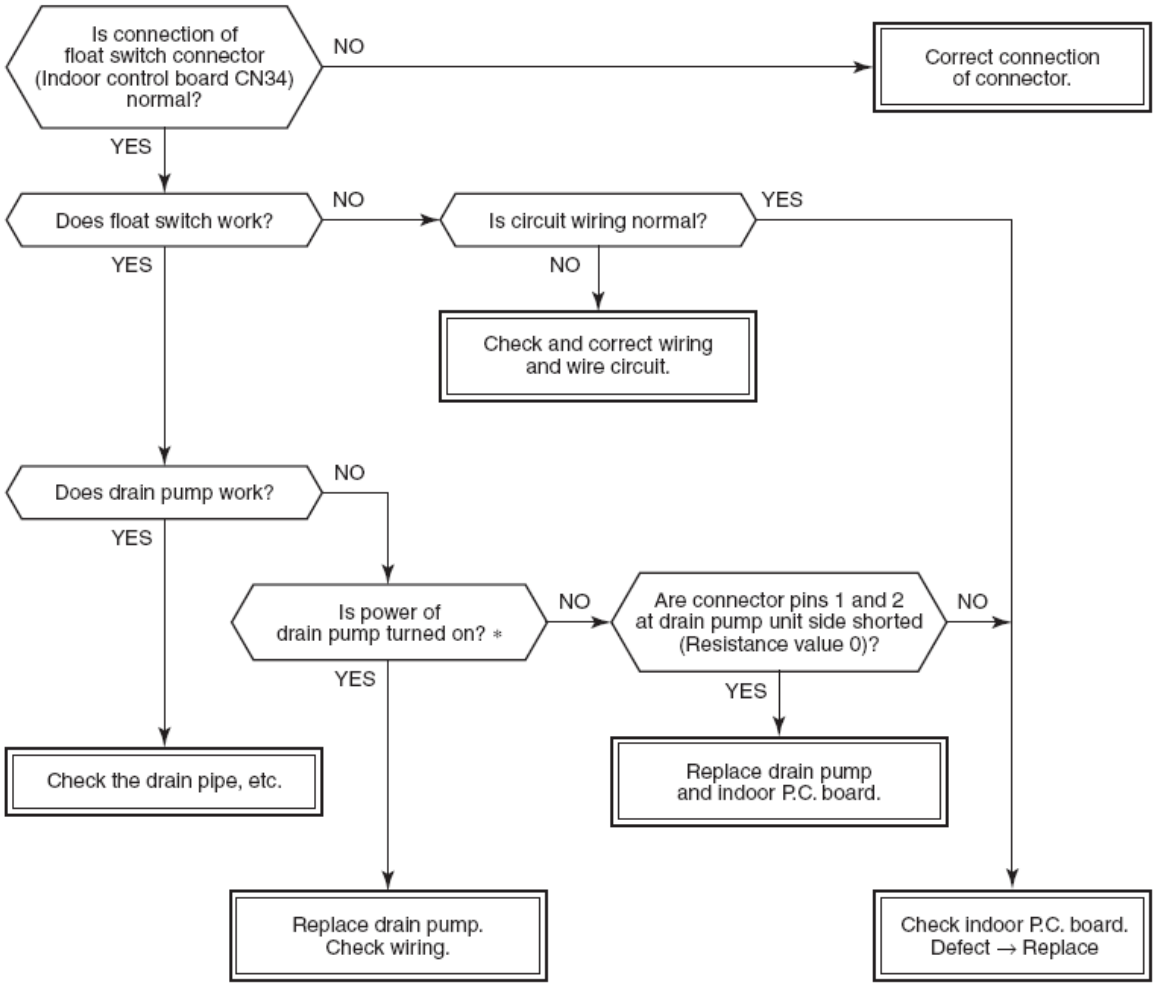
# Cassette and Under Ceiling Diagnostic Flow Charts – [E18] Error


Is inter-unit wire of A and B normal?
NO
Correct inter-unit wire of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit wiring.
NO
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
Check power connection status of indoor unit (Connect again).
YES
Is there no contact error of indoor/outdoor inter-unit wire (Signal line) of the main unit?
YES
Correct indoor/outdoor inter-unit wire (Serial signal line).
NO
Check indoor P.C. board. Defect → Replace

# All Units Diagnostic Flow Charts – [F10] Error

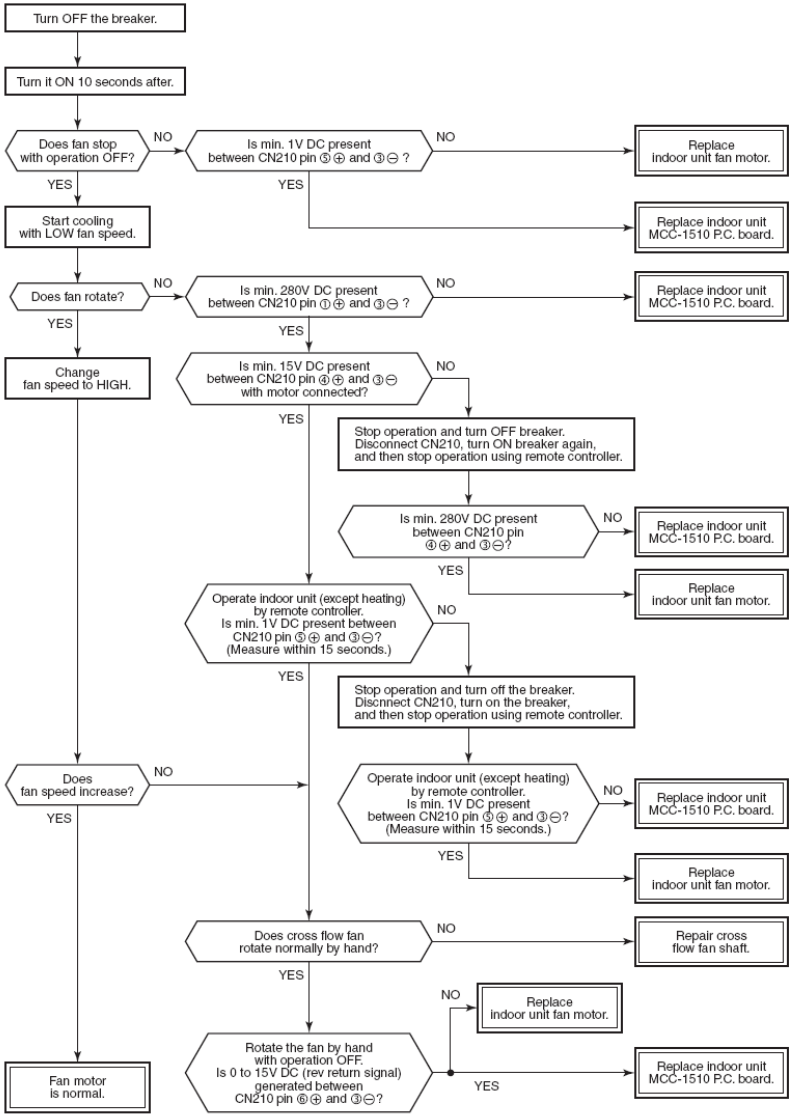

Is connection of TA sensor connector (CN104 on indoor P.C. board) correct?
NO
Correct connection of connector.
YES
Are characteristics of TA sensor resistance value normal?
NO
Replace TA sensor.
YES
* Refer to Characteristics-1.
Check indoor P.C. board (MCC-1510). Defect → Replace

# Cassette and Under Ceiling Diagnostic Flow Charts – [P10] Error

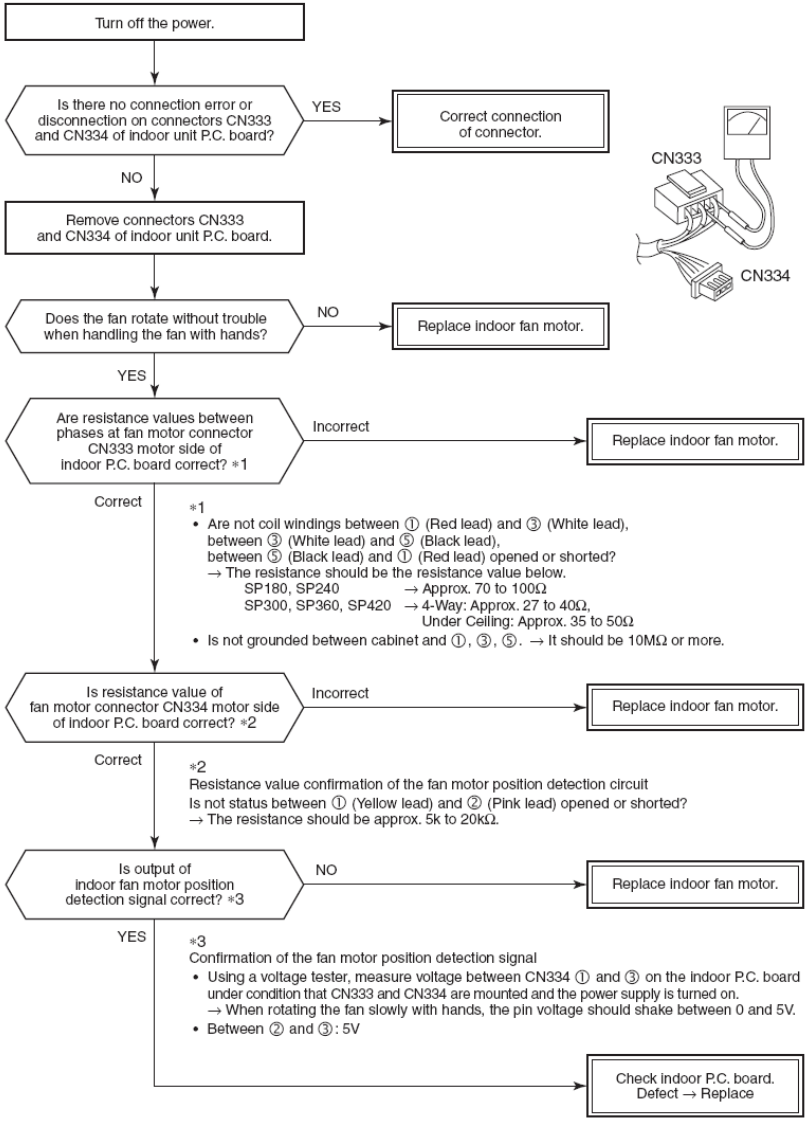



* Check that voltage of 1-2 pin of 4-way: CN504, Under Ceiling: CN68 on the indoor P.C. board is +12V. (1 pin is plus (+).)

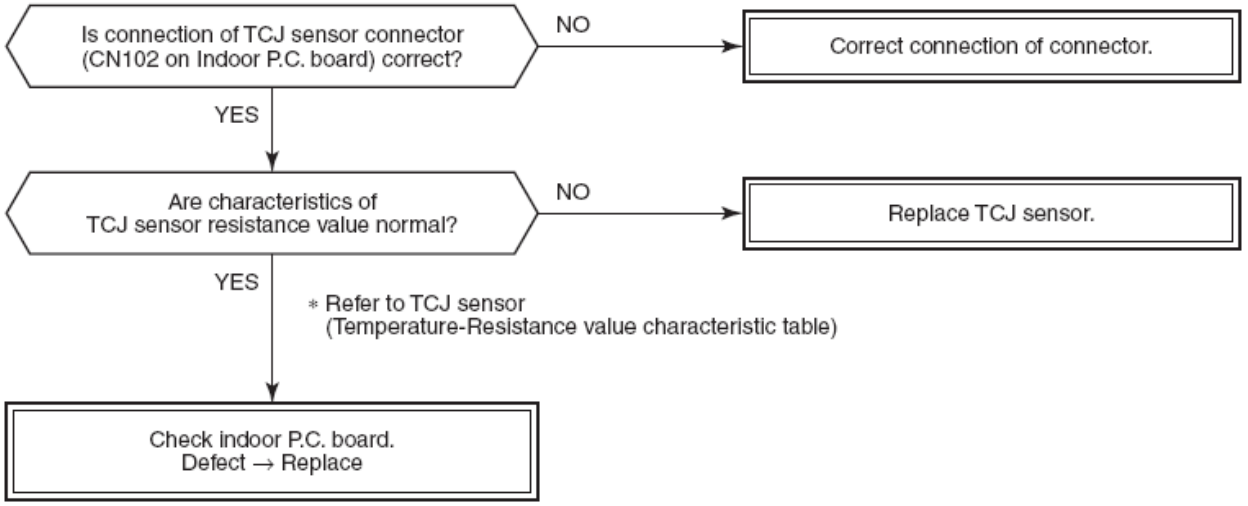
# High Wall Diagnostic Flow Charts – [P12] Error


Turn OFF the breaker.
Turn it ON 10 seconds after.
Does fan stop with operation OFF?
NO
Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖ ?
NO
Replace indoor unit fan motor.
YES
YES
Replace indoor unit MCC-1510 P.C. board.
Start cooling with LOW fan speed.
Does fan rotate?
NO
Is min. 280V DC present between CN210 pin ①⊕ and ③⊖ ?
NO
Replace indoor unit MCC-1510 P.C. board.
YES
YES
Change fan speed to HIGH.
Is min. 15V DC present between CN210 pin ④⊕ and ③⊖ with motor connected?
NO
YES
Stop operation and turn OFF breaker. Disconnect CN210, turn ON breaker again, and then stop operation using remote controller.
Is min. 280V DC present between CN210 pin ④⊕ and ③⊖?
NO
Replace indoor unit MCC-1510 P.C. board.
YES
Replace indoor unit fan motor.
Operate indoor unit (except heating) by remote controller. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
YES
Stop operation and turn off the breaker. Disconnect CN210, turn on the breaker, and then stop operation using remote controller.
Does fan speed increase?
NO
Operate indoor unit (except heating) by remote controller. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
Replace indoor unit MCC-1510 P.C. board.
YES
Replace indoor unit fan motor.
YES
Does cross flow fan rotate normally by hand?
NO
Repair cross flow fan shaft.
YES
NO
Replace indoor unit fan motor.
Rotate the fan by hand with operation OFF. Is 0 to 15V DC (rev return signal) generated between CN210 pin ⑥⊕ and ③⊖?
YES
Replace indoor unit MCC-1510 P.C. board.
Fan motor is normal.

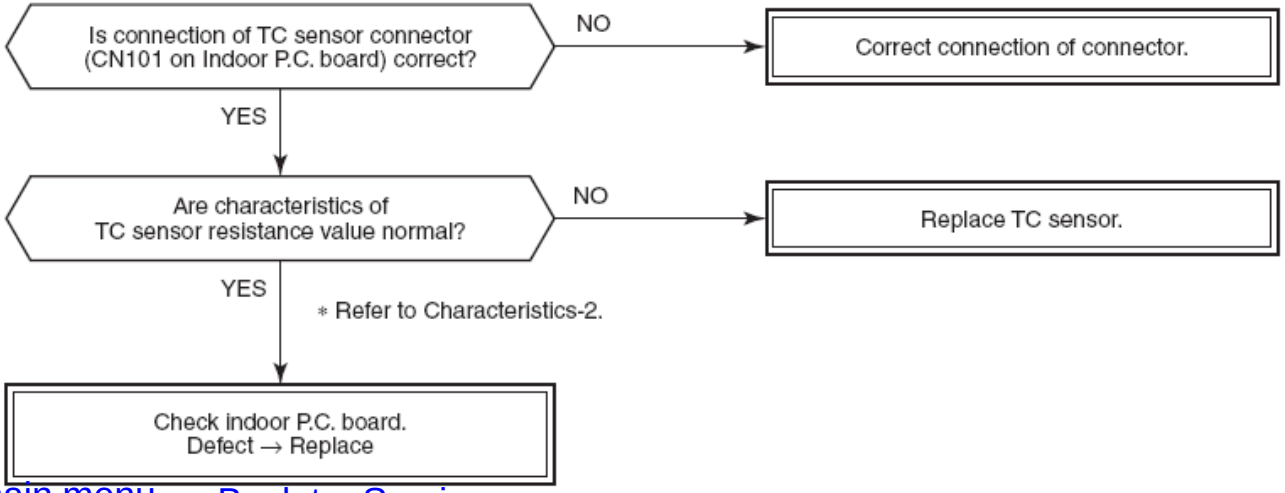
# Cassette and Under Ceiling Diagnostic Flow Charts – [P12] Error


Turn off the power.
Is there no connection error or disconnection on connectors CN333 and CN334 of indoor unit P.C. board?
YES
Correct connection of connector.
NO
Remove connectors CN333 and CN334 of indoor unit P.C. board.
Does the fan rotate without trouble when handling the fan with hands?
NO
Replace indoor fan motor.
YES
Are resistance values between phases at fan motor connector CN333 motor side of indoor P.C. board correct? *1
Incorrect
Replace indoor fan motor.
Correct
*1
• Are not coil windings between ① (Red lead) and ③ (White lead), between ③ (White lead) and ⑤ (Black lead), between ⑤ (Black lead) and ① (Red lead) opened or shorted?
→ The resistance should be the resistance value below.
SP180, SP240 → Approx. 70 to 100Ω
SP300, SP360, SP420 → 4-Way: Approx. 27 to 40Ω, Under Ceiling: Approx. 35 to 50Ω
• Is not grounded between cabinet and ①, ③, ⑤. → It should be 10MΩ or more.
Is resistance value of fan motor connector CN334 motor side of indoor P.C. board correct? *2
Incorrect
Replace indoor fan motor.
Correct
*2
Resistance value confirmation of the fan motor position detection circuit
Is not status between ① (Yellow lead) and ② (Pink lead) opened or shorted?
→ The resistance should be approx. 5k to 20kΩ.
Is output of indoor fan motor position detection signal correct? *3
NO
Replace indoor fan motor.
YES
*3
Confirmation of the fan motor position detection signal
• Using a voltage tester, measure voltage between CN334 ① and ③ on the indoor P.C. board under condition that CN333 and CN334 are mounted and the power supply is turned on.
→ When rotating the fan slowly with hands, the pin voltage should shake between 0 and 5V.
• Between ② and ③: 5V
Check indoor P.C. board.
Defect → Replace
CN333
CN334

# All Units Diagnostic Flow Charts – [F01] Error


Is connection of TCJ sensor connector (CN102 on Indoor P.C. board) correct?
NO
Correct connection of connector.
YES
Are characteristics of TCJ sensor resistance value normal?
NO
Replace TCJ sensor.
YES
* Refer to TCJ sensor (Temperature-Resistance value characteristic table)
Check indoor P.C. board. Defect → Replace

# All Units Diagnostic Flow Charts – [F02] Error


Is connection of TC sensor connector (CN101 on Indoor P.C. board) correct?
NO
Correct connection of connector.
YES
Are characteristics of TC sensor resistance value normal?
NO
Replace TC sensor.
YES
* Refer to Characteristics-2.
Check indoor P.C. board. Defect → Replace

# High Wall Diagnostic Flow Charts – [F29] Error

EEPROM error. Replace P.C. board.

# Diagnostic Procedure – Outdoor Units

The error code display varies based on outdoor unit model (See below)

RAV-SP180AT2-UL

P.C. Board does not have LED indicators

If LED indicators are desired, “Application Control Kit “ (TCB-PCOS1UL) can be connected to unit

Indoor unit /remote control displays some of the outdoor error codes

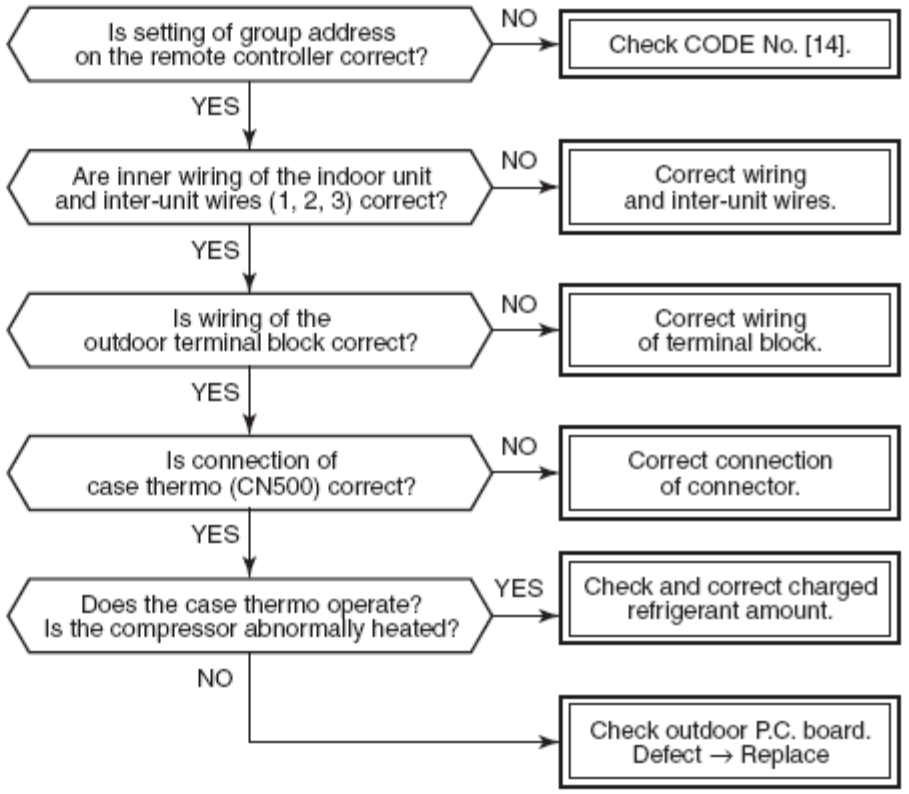
RAV-SP240AT2-UL,RAV-SP300AT2-UL, RAV-SP360AT2-UL, RAV-SP420AT2-UL

P.C. board does have LED indicators to display error codes

Indoor unit/remote control displays some of the outdoor error codes

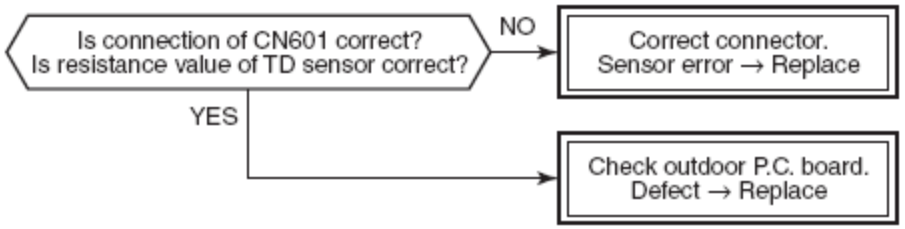
# RAV-SP180AT2-UL – [E04] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [E04] | — | [Indoor / Outdoor communication error] |

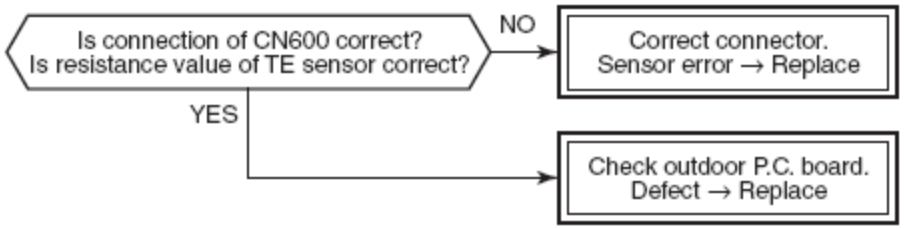

Is setting of group address on the remote controller correct?
NO
Check CODE No. [14].
YES
Are inner wiring of the indoor unit and inter-unit wires (1, 2, 3) correct?
NO
Correct wiring and inter-unit wires.
YES
Is wiring of the outdoor terminal block correct?
NO
Correct wiring of terminal block.
YES
Is connection of case thermo (CN500) correct?
NO
Correct connection of connector.
YES
Does the case thermo operate? Is the compressor abnormally heated?
YES
Check and correct charged refrigerant amount.
NO
Check outdoor P.C. board. Defect → Replace

# RAV-SP180AT2-UL – [F04] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [F04] | D01 (Red) ○ D02 (Yellow) ○ D03 (Yellow) ● D04 (Yellow) ● | [Discharge temp. sensor (TD) error] |



# RAV-SP180AT2-UL – [F06] Error

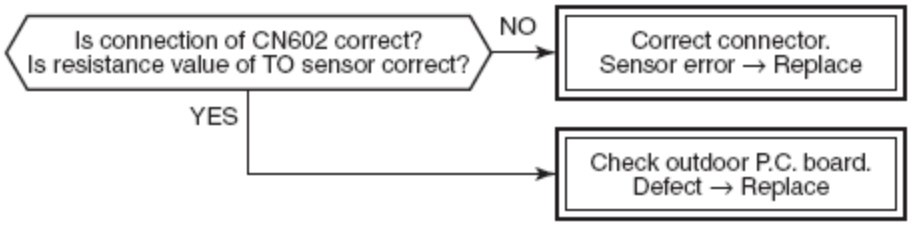
| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [F06] | * There is a possibility that any of the following items is not correct. Checking LED on the APPLICATION CONTROL KIT enables you to judge what is incorrect. | |
| | D01 (Red) ○ D02 (Yellow) ● D03 (Yellow) ● D04 (Yellow) ● | **[Heat exchanger temp. sensor (TE) error]**  Is connection of CN600 correct? Is resistance value of TE sensor correct?<br>NO<br>Correct connector. Sensor error → Replace<br>YES<br>Check outdoor P.C. board. Defect → Replace |
| | D01 (Red) ● D02 (Yellow) ● D03 (Yellow) ○ D04 (Yellow) ● | **[Suction temp. sensor (TS) error] → Refer to column of [F12].** |



Back to main menu Back to Service

# RAV-SP180AT2-UL – [F08] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [F08] | D01 (Red) ● D02 (Yellow) ○ D03 (Yellow) ● D04 (Yellow) ● | [Outside temp. sensor (TO) error] |

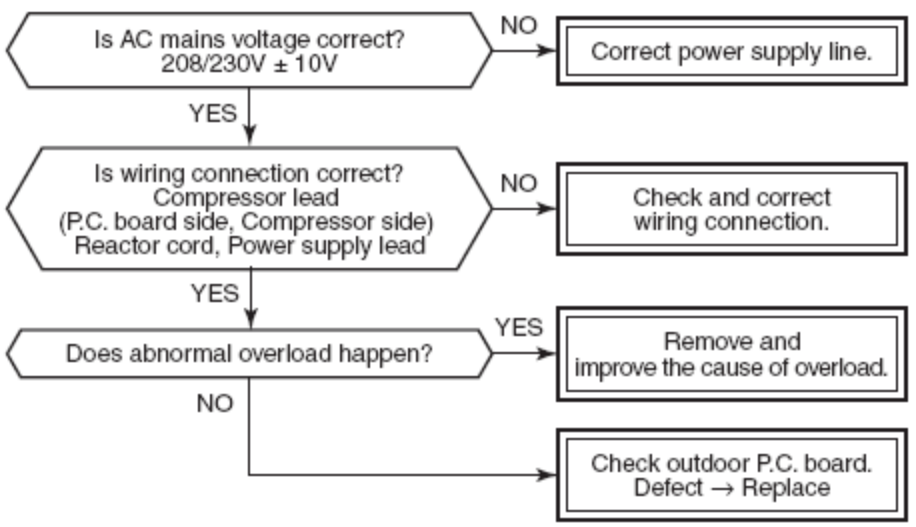


# RAV-SP180AT2-UL – [F12] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [F12] | D01 (Red) ● D02 (Yellow) ● D03 (Yellow) ○ D04 (Yellow) ● | [Suction temp. sensor (TS) error]<br>Is connection of CN603 correct? Is resistance value of TS sensor correct? → NO → Correct connector. Sensor error → Replace<br>YES → Check outdoor P.C. board. Defect → Replace |

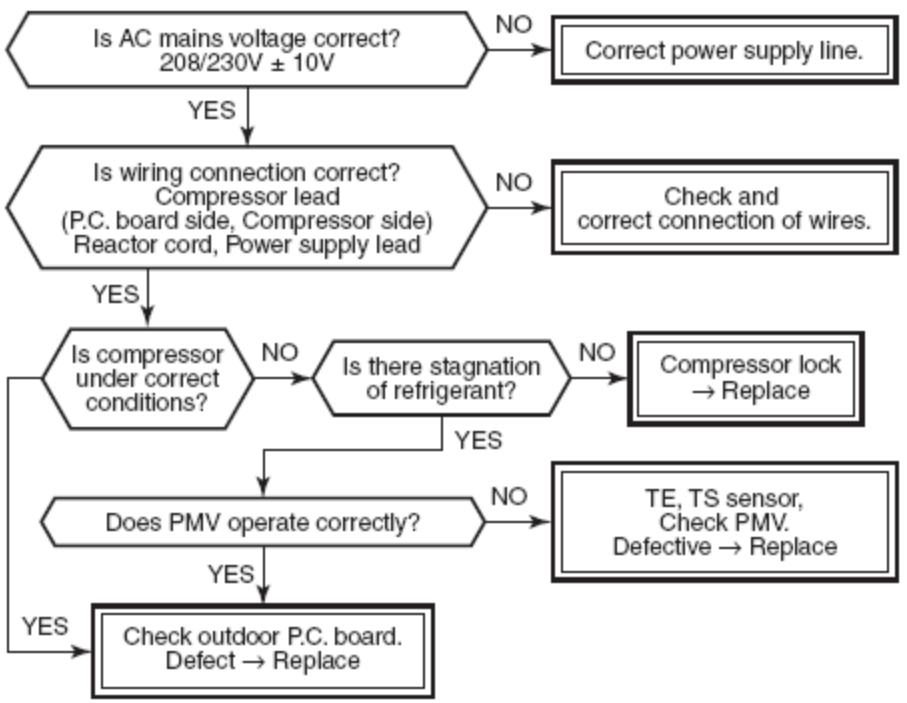
# RAV-SP180AT2-UL – [H01] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [H01] | D01 (Red) ◎ D02 (Yellow) ● D03 (Yellow) ◎ D04 (Yellow) ● | [Compressor breakdown] |



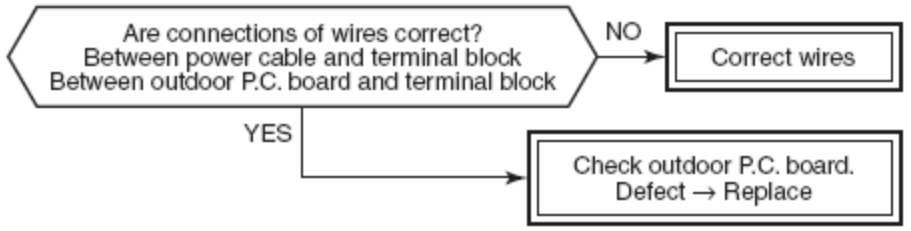
# RAV-SP180AT2-UL – [H02] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [H02] | D01 (Red) ● D02 (Yellow) ● D03 (Yellow) ◎ D04 (Yellow) ● | [Compressor lock] |



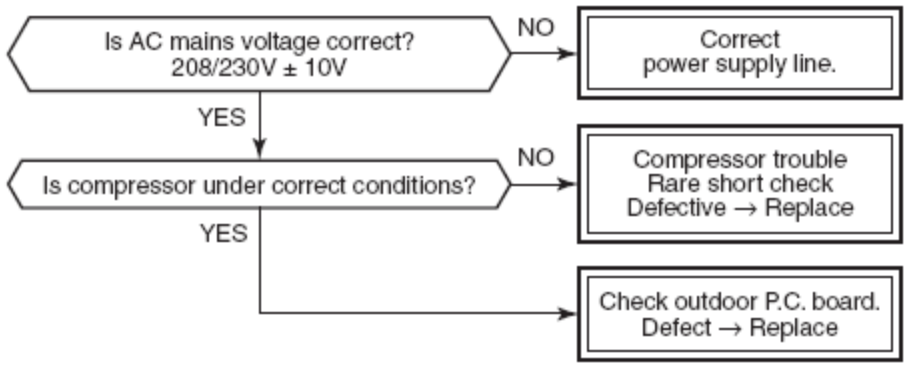
# RAV-SP180AT2-UL – [H03] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [H03] | D01 (Red) ◎ D02 (Yellow) ◎ D03 (Yellow) ● D04 (Yellow) ● | [Power supply error, Current detection circuit error] |



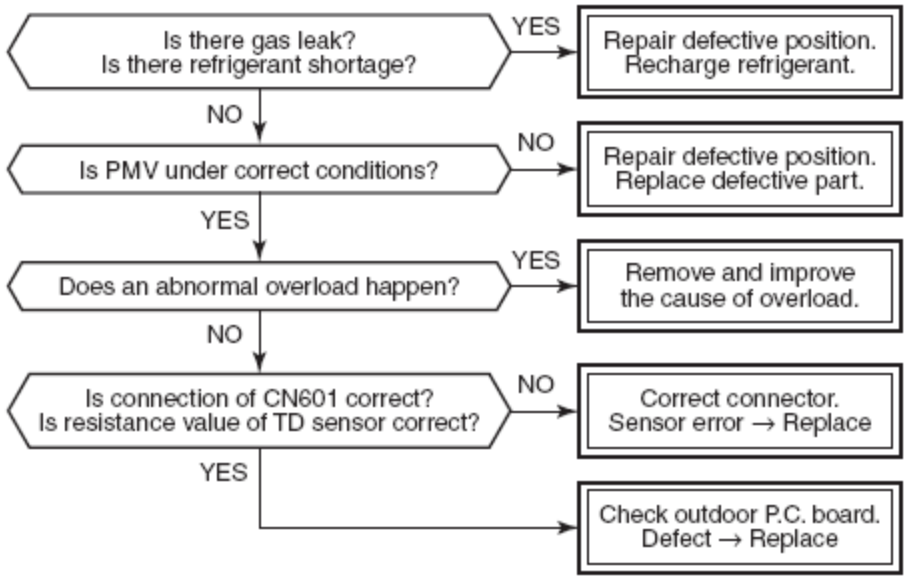
# RAV-SP180AT2-UL – [L29] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [L29] | D01 (Red) ○ D02 (Yellow) ● D03 (Yellow) ● D04 (Yellow) ○<br>or<br>● ◎ ◎ ● | **[Power supply error, Current detection circuit error]** |



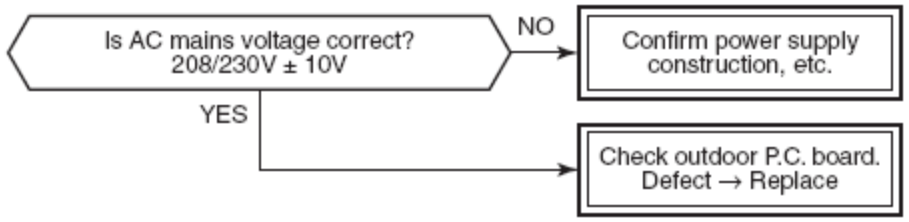
# RAV-SP180AT2-UL – [P03] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P03] | D01 (Red) ● D02 (Yellow) ○ D03 (Yellow) ○ D04 (Yellow) ● | [Discharge temp. error] |



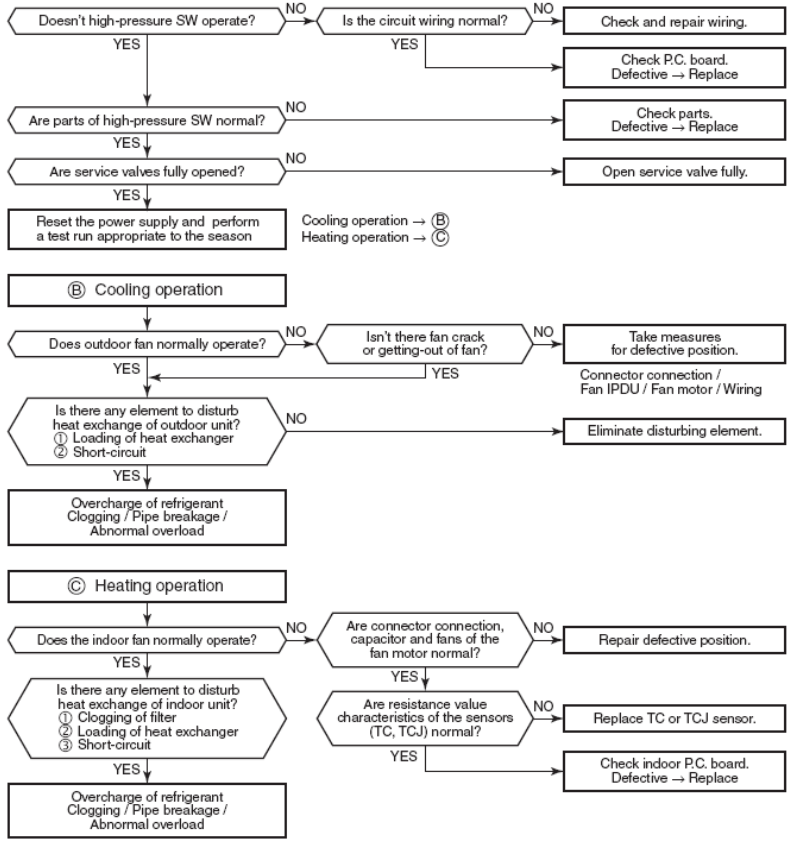
# RAV-SP180AT2-UL – [P04] Voltage Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P04] | D01 (Red) ○ D02 (Yellow) ● D03 (Yellow) ● D04 (Yellow) ○ | [Power supply error (Voltage error)] |



# RAV-SP180AT2-UL – [P04] High Pressure Switch Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P04] | D01 (Red) D02 (Yellow) D03 (Yellow) D04 (Yellow)<br>○ ● ● ○<br>or<br>● ○ ● ○ | **[High-pressure SW error]**<br>1. High-pressure SW error<br>2. Service valve closed.<br>3. Indoor/Outdoor fan error<br>4. Clogging of indoor/outdoor PMV<br>5. Loading of indoor/outdoor heat exchangers or short-circuit<br>6. Overcharge of refrigerant |

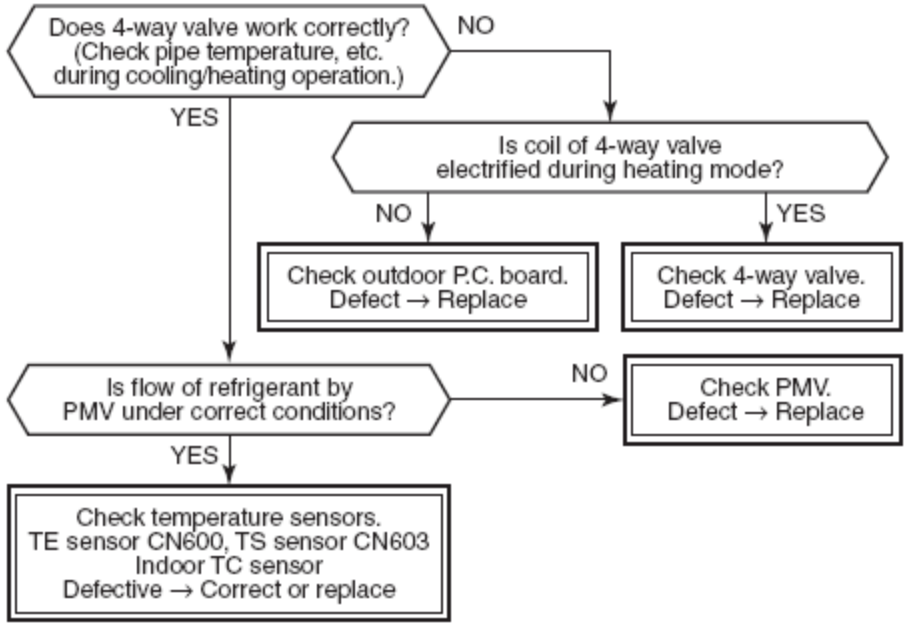

Doesn't high-pressure SW operate?
NO
Is the circuit wiring normal?
NO
Check and repair wiring.
YES
YES
Check P.C. board. Defective → Replace
Are parts of high-pressure SW normal?
NO
Check parts. Defective → Replace
YES
Are service valves fully opened?
NO
Open service valve fully.
YES
Reset the power supply and perform a test run appropriate to the season
Cooling operation → Ⓑ
Heating operation → Ⓒ
Ⓑ Cooling operation
Does outdoor fan normally operate?
NO
Isn't there fan crack or getting-out of fan?
NO
Take measures for defective position.
YES
YES
Connector connection / Fan IPDU / Fan motor / Wiring
Is there any element to disturb heat exchange of outdoor unit? ① Loading of heat exchanger ② Short-circuit
NO
Eliminate disturbing element.
YES
Overcharge of refrigerant Clogging / Pipe breakage / Abnormal overload
Ⓒ Heating operation
Does the indoor fan normally operate?
NO
Are connector connection, capacitor and fans of the fan motor normal?
NO
Repair defective position.
YES
YES
Is there any element to disturb heat exchange of indoor unit? ① Clogging of filter ② Loading of heat exchanger ③ Short-circuit
Are resistance value characteristics of the sensors (TC, TCJ) normal?
NO
Replace TC or TCJ sensor.
YES
YES
Check indoor P.C. board. Defective → Replace
Overcharge of refrigerant Clogging / Pipe breakage / Abnormal overload

# RAV-SP180AT2-UL – [P05] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P05] | D01 (Red) D02 (Yellow) D03 (Yellow) D04 (Yellow)<br>◎ ◎ ● ●<br>or<br>○ ● ● ○ | **[Power supply error (Voltage error)]**<br>→ Refer to columns [H03] and [P04] and then check power supply and voltage erro |

# RAV-SP180AT2-UL – [P19] Error

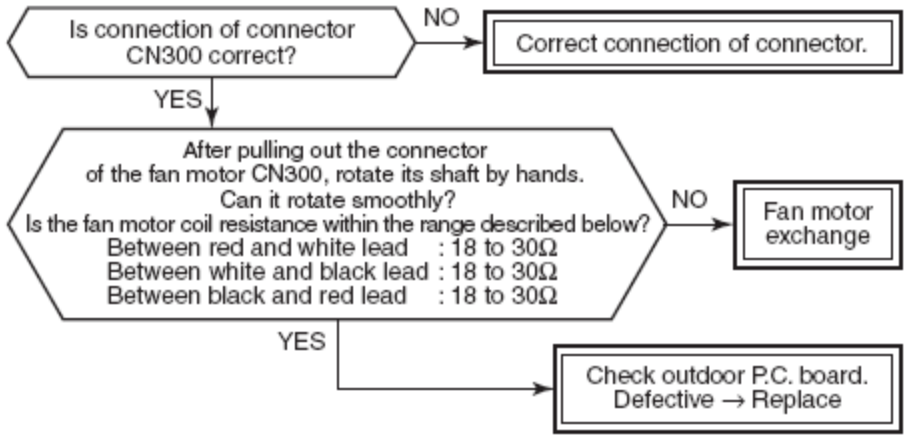
| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P19] | — | [4-way reversal error] |


Does 4-way valve work correctly? (Check pipe temperature, etc. during cooling/heating operation.)
NO
YES
Is coil of 4-way valve electrified during heating mode?
NO
YES
Check outdoor P.C. board. Defect → Replace
Check 4-way valve. Defect → Replace
Is flow of refrigerant by PMV under correct conditions?
NO
Check PMV. Defect → Replace
YES
Check temperature sensors. TE sensor CN600, TS sensor CN603 Indoor TC sensor Defective → Correct or replace

* In case of RAV-SP180AT2-UL, the coil of 4-way valve is electrified during cooling cycling.
* In cooling operation, [P19] error may be displayed when the refrigerant pressure rises high abnormally. In this case, remove the cause of pressure rising and then diagnose it again.

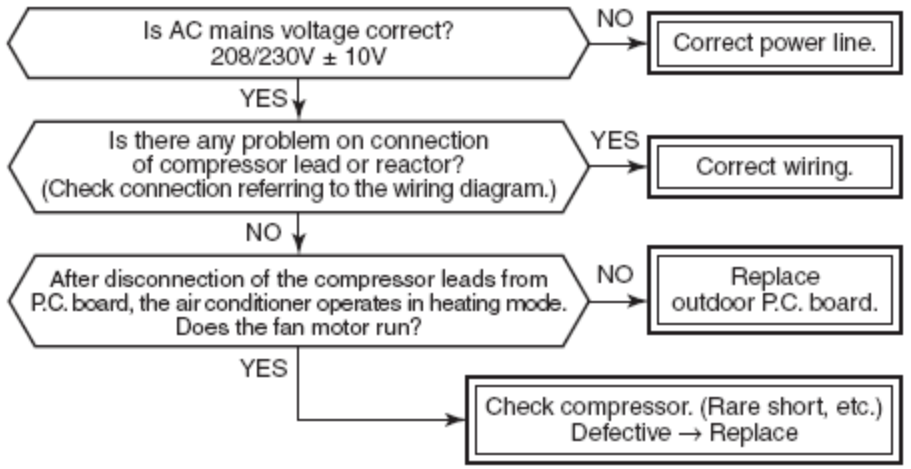
# RAV-SP180AT2-UL – [P22] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P22] | D01 (Red) ○ D02 (Yellow) ○ D03 (Yellow) ○ D04 (Yellow) ● | [Outdoor fan system error] |


Is connection of connector CN300 correct?
NO
Correct connection of connector.
YES
After pulling out the connector of the fan motor CN300, rotate its shaft by hands. Can it rotate smoothly?
Is the fan motor coil resistance within the range described below?
Between red and white lead : 18 to 30Ω
Between white and black lead : 18 to 30Ω
Between black and red lead : 18 to 30Ω
NO
Fan motor exchange
YES
Check outdoor P.C. board. Defective → Replace

# RAV-SP180AT2-UL – [P26] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P26] | D01 (Red) ◎ D02 (Yellow) ● D03 (Yellow) ● D04 (Yellow) ● | [Short-circuit of compressor driving device] |


Is AC mains voltage correct?
208/230V ± 10V
NO
Correct power line.
YES
Is there any problem on connection of compressor lead or reactor?
(Check connection referring to the wiring diagram.)
YES
Correct wiring.
NO
After disconnection of the compressor leads from P.C. board, the air conditioner operates in heating mode. Does the fan motor run?
NO
Replace outdoor P.C. board.
YES
Check compressor. (Rare short, etc.)
Defective → Replace

# RAV-SP180AT2-UL – [P29] Error

| CODE No. | APPLICATION CONTROL KIT LED display | Check / Countermeasures (Part without special mention indicates a part of the outdoor unit.) |
|---|---|---|
| [P29] | D01 (Red) ● D02 (Yellow) ◎ D03 (Yellow) ● D04 (Yellow) ● | [Position detection circuit error]<br>Check outdoor P.C. board.<br>Defective → Replace |

# RAV-SP240 - 420AT2-UL – LED Display

<Display 1> ⇔ <Display 2>

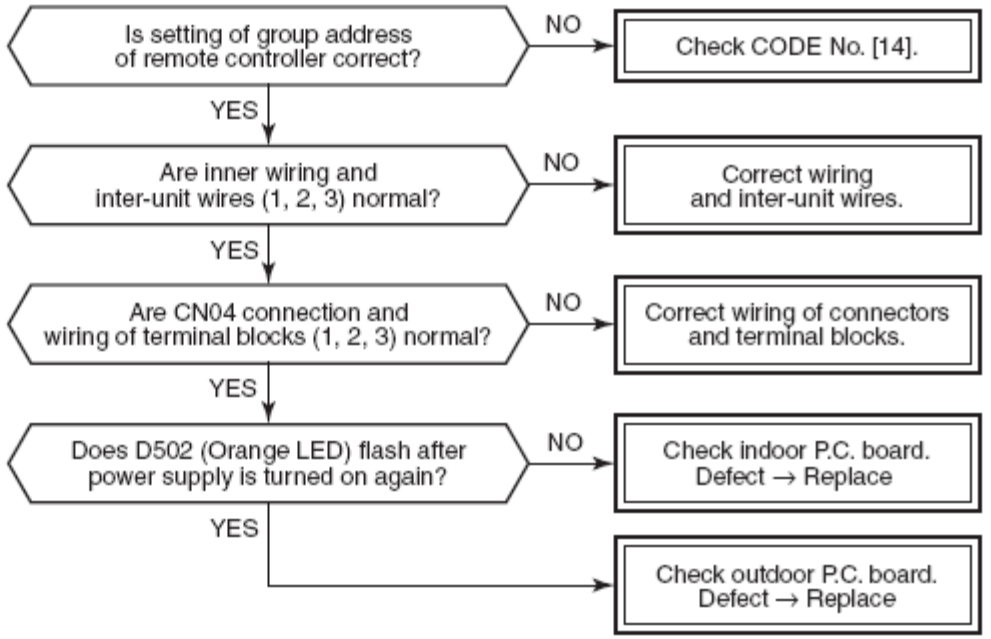
| | (No error) | (Error occurred) | (Push SW800) |
|---|---|---|---|
| D800 (Yellow) | ● | ○ | ● |
| D801 (Yellow) | ● | ○ | ● |
| D802 (Yellow) | ● | ● | ◎ |
| D803 (Yellow) | ● | ● | ● |
| D804 (Yellow) | ● | ○ | ● |
| D805 (Green) | ○ | ○ | ○ |

(Example of discharge temp. sensor error)

● : Go off, ○ : Go on, ◎ : Flash

# RAV-SP240 - 420AT2-UL – [E04] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [E04] | — | [Indoor/Outdoor communication error] |


Is setting of group address of remote controller correct?
NO
Check CODE No. [14].
YES
Are inner wiring and inter-unit wires (1, 2, 3) normal?
NO
Correct wiring and inter-unit wires.
YES
Are CN04 connection and wiring of terminal blocks (1, 2, 3) normal?
NO
Correct wiring of connectors and terminal blocks.
YES
Does D502 (Orange LED) flash after power supply is turned on again?
NO
Check indoor P.C. board. Defect → Replace
YES
Check outdoor P.C. board. Defect → Replace

# RAV-SP240 - 420AT2-UL – [F04] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F04] | <Display 1> <Display 2><br>○ ●<br>○ ●<br>● ◎<br>● ●<br>○ ●<br>○ ○ | [Discharge temp. sensor (TD) error]<br>Is CN603 connection normal?<br>Is resistance value of TD sensor normal?<br>NO → Correct connector.<br>Sensor error → Replace<br>YES → Check outdoor P.C. board.<br>Defect → Replace |

# RAV-SP240 - 420AT2-UL – [F06] Error

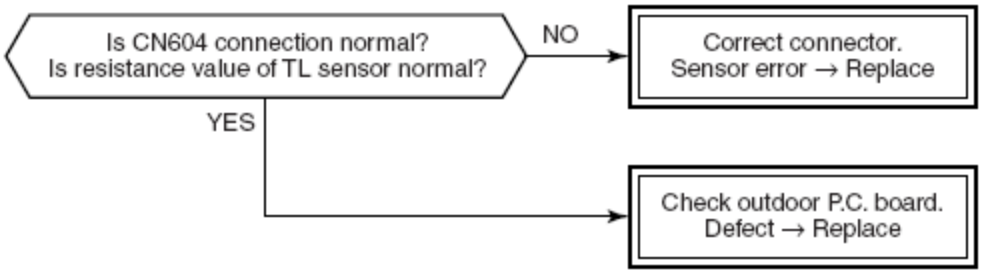
| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F06] | | • There is a possibility that it is one of the following errors.<br>Confirm LED on outdoor P.C. board to judge which error it is.<br>Heat exchanger temp. sensor (TE) error, Heat exchanger temp. sensor (TL) error, Suction temp. sensor (TS) error, Miswiring of heat exchanger sensor (TE, TS) |
| | <Display 1> <Display 2><br>○ ●<br>○ ◎<br>● ◎<br>● ●<br>○ ●<br>○ ○ | **Heat exchanger temp. sensor (TE) error]**<br>Is CN601 connection normal? Is resistance value of TE sensor normal? — NO → Correct connector. Sensor error → Replace<br>YES → Check outdoor P.C. board. Defect → Replace |
| | <Display 1> <Display 2><br>○ ◎<br>○ ◎<br>● ◎<br>● ●<br>○ ●<br>○ ○ | **[Heat exchanger temp. sensor (TL) error]** → Refer to **[F07]** column. |

# RAV-SP240 - 420AT2-UL – [F06] Error - Continued

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| | <Display 1> <Display 2><br>○ ●<br>○ ●<br>● ◎<br>● ◎<br>○ ●<br>○ ○ | **[Suction temp. sensor (TS) error]** → Refer to **[F12]** column. |
| | <Display 1> <Display 2><br>○ ◎<br>○ ◎<br>● ◎<br>● ◎<br>○ ●<br>○ ○ | **[Miswiring of heat exchanger sensor (TE, TS)]** → Refer to **[F15]** column. |

# RAV-SP240 - 420AT2-UL – [F07] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F07] | <Display 1> <Display 2> | [Heat exchanger temp. sensor (TL) error] |



# RAV-SP240 - 420AT2-UL – [F08] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F08] | <Display 1> <Display 2><br>○ ●<br>○ ●<br>● ●<br>● ◎<br>○ ●<br>○ ○ | [Outside air temp. sensor (TO) error]<br>Is CN602 connection normal? Is resistance value of TO sensor normal?<br>NO → Correct connector. Sensor error → Replace<br>YES → Check outdoor P.C. board. Defect → Replace |

# RAV-SP240 - 420AT2-UL – [F12] Error

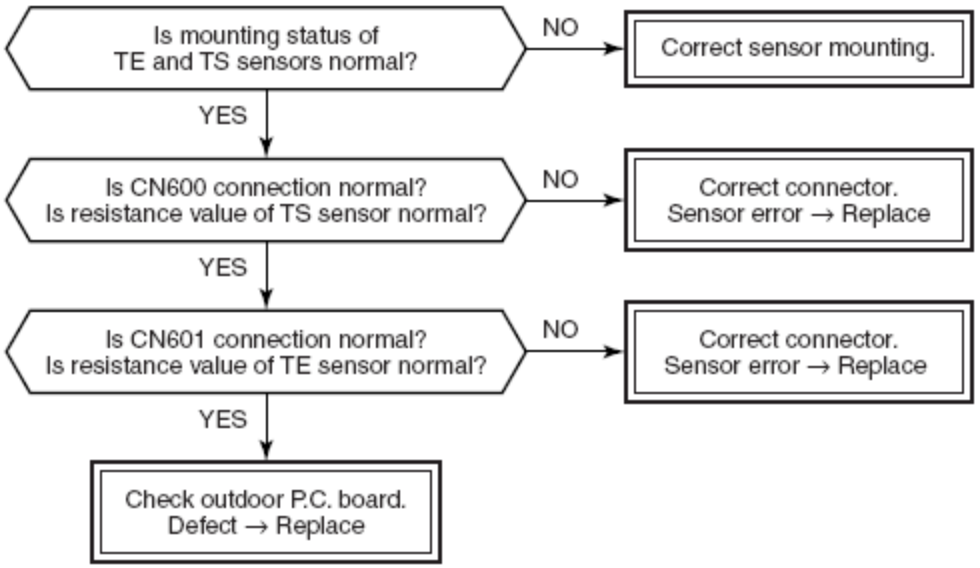
| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F12] | <Display 1> <Display 2><br>○ ●<br>○ ●<br>● ◎<br>● ◎<br>○ ●<br>○ ○ | [Suction temp. sensor (TS) error]<br>Is CN600 connection normal? Is resistance value of TS sensor normal?<br>NO → Correct connector. Sensor error → Replace<br>YES → Check outdoor P.C. board. Defect → Replace |

# RAV-SP240 - 420AT2-UL – [F13] Error

| CODE No. | Outdoor LED display | | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|---|
| [F13] | <Display 1> | <Display 2> | [Heat sink temp. sensor (TH) error] |
| | ○ | ◎ | |
| | ○ | ● | Check outdoor P.C. board. Defect → Replac |
| | ● | ◎ | |
| | ● | ◎ | |
| | ○ | ● | |
| | ○ | ○ | |

# RAV-SP240 - 420AT2-UL – [F15] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F15] | <Display 1> <Display 2> ○ ◎ ○ ◎ ● ◎ ● ◎ ○ ● ○ ○ | [Miswiring of heat exchanger sensor (TE, TS)] |

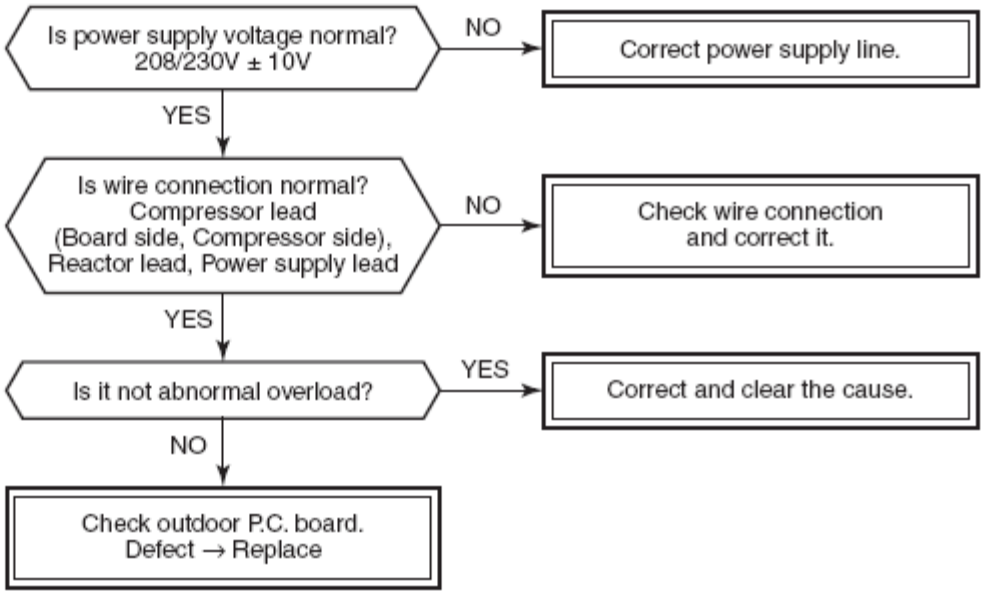

Is mounting status of TE and TS sensors normal?
NO
Correct sensor mounting.
YES
Is CN600 connection normal? Is resistance value of TS sensor normal?
NO
Correct connector. Sensor error → Replace
YES
Is CN601 connection normal? Is resistance value of TE sensor normal?
NO
Correct connector. Sensor error → Replace
YES
Check outdoor P.C. board. Defect → Replace

# RAV-SP240 - 420AT2-UL – [F31] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [F31] | <Display 1> ○ ○ ● ● ○ ○ <Display 2> ◎ ◎ ◎ ◎ ◎ ○ | [EEPROM error]<br>Check outdoor P.C. board.<br>Defect → Replace |

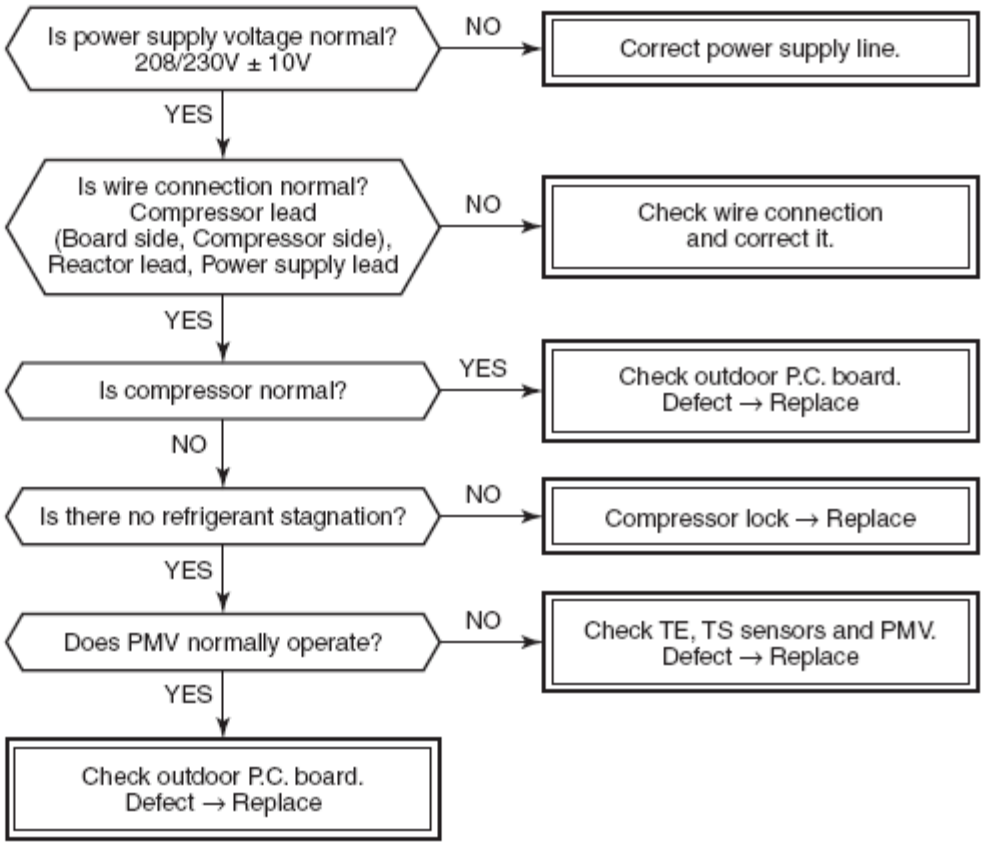
# RAV-SP240 - 420AT2-UL – [H01] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [H01] | <Display 1> <Display 2> | [Compressor break down] |



# RAV-SP240 - 420AT2-UL – [H02] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [H02] | <Display 1> <Display 2> | [Compressor lock] |

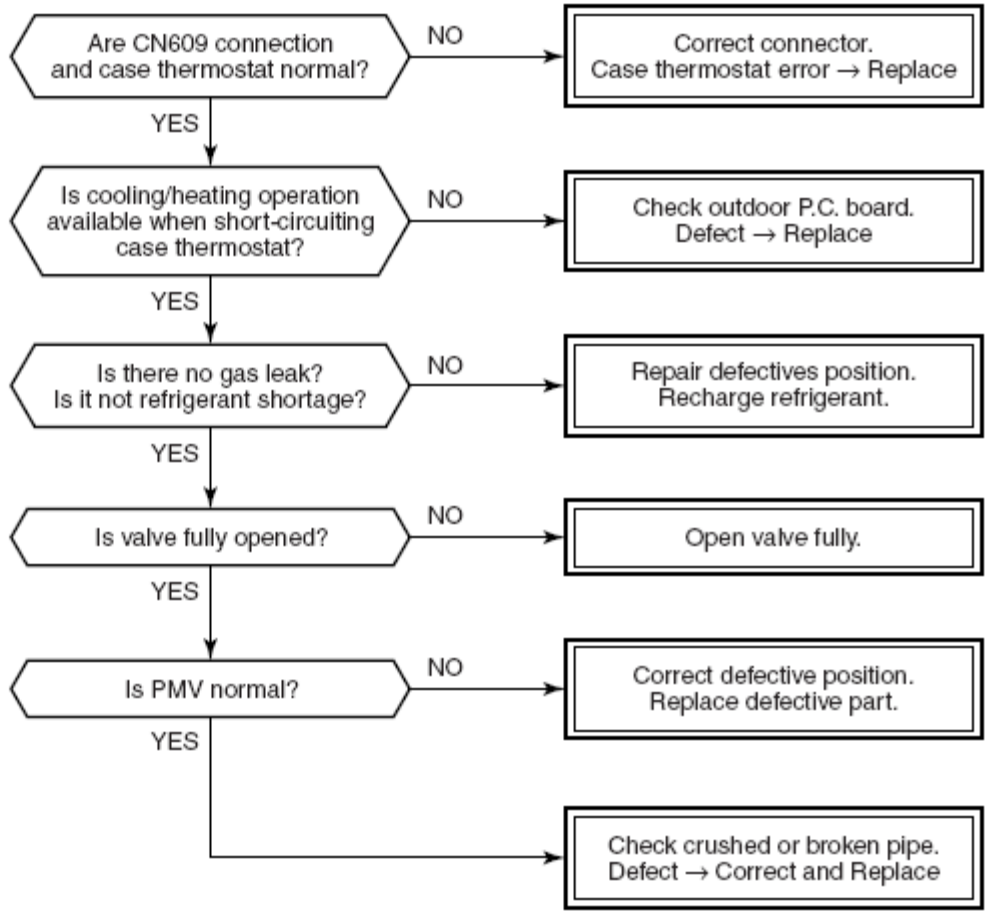


# RAV-SP240 - 420AT2-UL – [H03] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [H03] | <Display 1> <Display 2><br>● ◎<br>● ◎<br>○ ●<br>● ●<br>○ ●<br>○ ○ | [Current detection circuit error]<br>Check outdoor P.C. board.<br>Defect → Replace |

# RAV-SP240 - 420AT2-UL – [H04] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [H04] | <Display 1> <Display 2> | [Case thermostat operation] |



# RAV-SP240 - 420AT2-UL – [L10] Error

| CODE No. | Outdoor LED display | | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|---|
| [L10] | <Display 1> | <Display 2> | **[Unset model type]:** Only when service P.C. board is used<br><br>Cut jumper line according to the explanation sheet packaged with the service P.C. board. |
| | ● | ● | |
| | ○ | ◎ | |
| | ○ | ● | |
| | ● | ◎ | |
| | ○ | ● | |
| | ○ | ○ | |

# RAV-SP240 - 420AT2-UL – [L29] Error

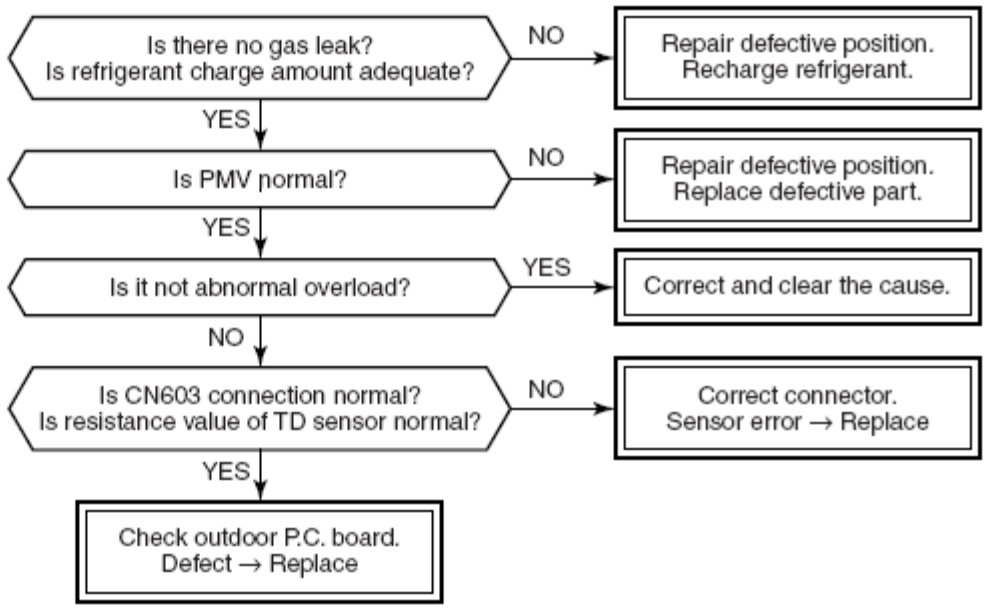
| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [L29] | ∗ There is a possibility that it is one of the following errors.<br>Confirm LED on outdoor P.C. board to judge which error it is.<br>Communication error between MCU, Heat sing temp. sensor (TH) error, EEPROM error, Unset model type, Heat sink overheat error, Gas leak detection, 4-way valve inverse error | |
| | <Display 1> <Display 2><br>● ◎<br>○ ●<br>○ ◎<br>● ◎<br>○ ◎<br>○ ○ | **[Communication error between MCU]**<br>Check outdoor P.C. board.<br>Defect → Replace |
| | <Display 1> <Display 2><br>○ ◎<br>○ ◎<br>○ ◎<br>● ●<br>○ ●<br>○ ○ | **[Heat sink temp. sensor (TH) error]** → Refer to **[F13]** column. |

# RAV-SP240 - 420AT2-UL – [L29] Error - Continued

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [L29] (Continued) | <Display 1> <Display 2> ○ ◎ ○ ◎ ● ◎ ● ◎ ○ ◎ ○ ○ | **[EEPROM error]** → Refer to **[F31]** column. |
| | <Display 1> <Display 2> ● ● ○ ◎ ○ ● ● ◎ ○ ● ○ ○ | **[Unset model type]** → Refer to **[L10]** column. |
| | <Display 1> <Display 2> ○ ◎ ○ ◎ ○ ◎ ● ● ○ ● ○ ○ | **[Heat sink overheat error]** → Refer to **[P07]** column. |
| | <Display 1> <Display 2> ○ ◎ ○ ◎ ○ ◎ ● ◎ ○ ● ○ ○ | **[Gas leak detection]** → Refer to **[P15]** column. |
| | <Display 1> <Display 2> ○ ◎ ○ ◎ ○ ● ● ● ○ ◎ ○ ○ | **[4-way valve inverse error]** → Refer to **[P19]** column. |

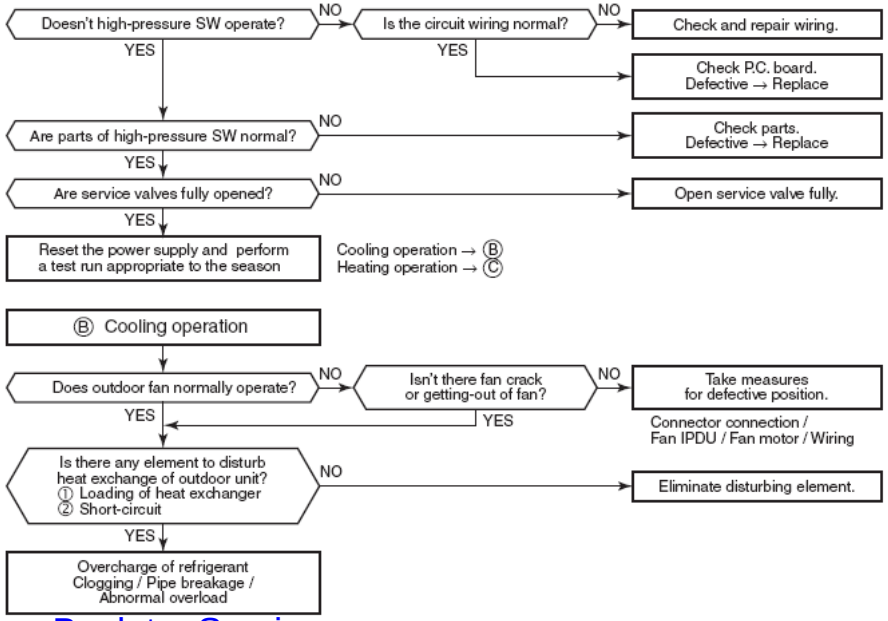
# RAV-SP240 - 420AT2-UL – [P03] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P03] | <Display 1> <Display 2> | [Discharge temp. error] |

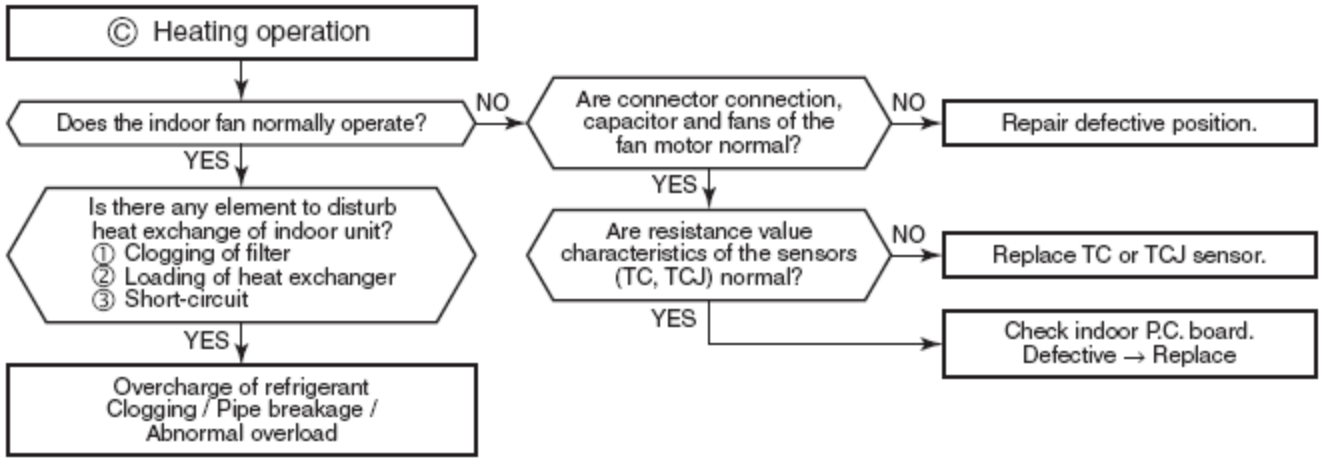


# RAV-SP240 - 420AT2-UL – [P04] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P04] | | * There is a possibility that it is one of the following errors.<br>Confirm LED on outdoor P.C. board to judge which error it is.<br>Power supply error (Vdo), High pressure protective operation, Case thermostat operation |
| | <Display 1> <Display 2><br>● ●<br>● ●<br>○ ◎<br>● ●<br>○ ●<br>○ ○ | **[Case thermostat operation]** → Refer to **[H04]** column. |
| | <Display 1> <Display 2><br>○ ●<br>○ ●<br>○ ◎<br>● ●<br>○ ●<br>○ ○ | **[High-pressure SW error]**<br>1. High-pressure SW error<br>2. Service valve closed.<br>3. Indoor/Outdoor fan error<br>4. Clogging of indoor/outdoor PMV<br>5. Loading of indoor/outdoor heat exchangers or short-circuit<br>6. Overcharge of refrigerant |



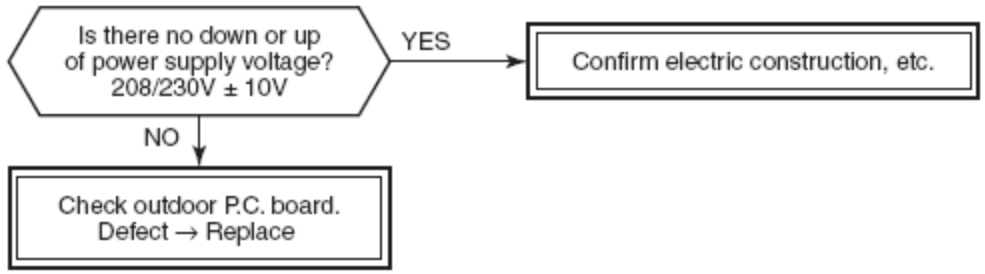
# RAV-SP240 - 420AT2-UL – [P04] Error Continued

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| | |  |
| [P04] (Continued) | <Display 1> <Display 2> ○ ◎ ○ ● ○ ● ● ◎ ○ ● ○ ○ | [Power supply error (Vdc)] → Refer to [P05] column. |
| | <Display 1> <Display 2> ○ ● ○ ● ○ ◎ ● ● ○ ◎ ○ ○ | [High pressure protective operation] → Refer to [P20] column. |

Ⓒ Heating operation
Does the indoor fan normally operate?
NO
Are connector connection, capacitor and fans of the fan motor normal?
NO
Repair defective position.
YES
YES
Is there any element to disturb heat exchange of indoor unit?
① Clogging of filter
② Loading of heat exchanger
③ Short-circuit
Are resistance value characteristics of the sensors (TC, TCJ) normal?
NO
Replace TC or TCJ sensor.
YES
YES
Check indoor P.C. board. Defective → Replace
Overcharge of refrigerant
Clogging / Pipe breakage / Abnormal overload

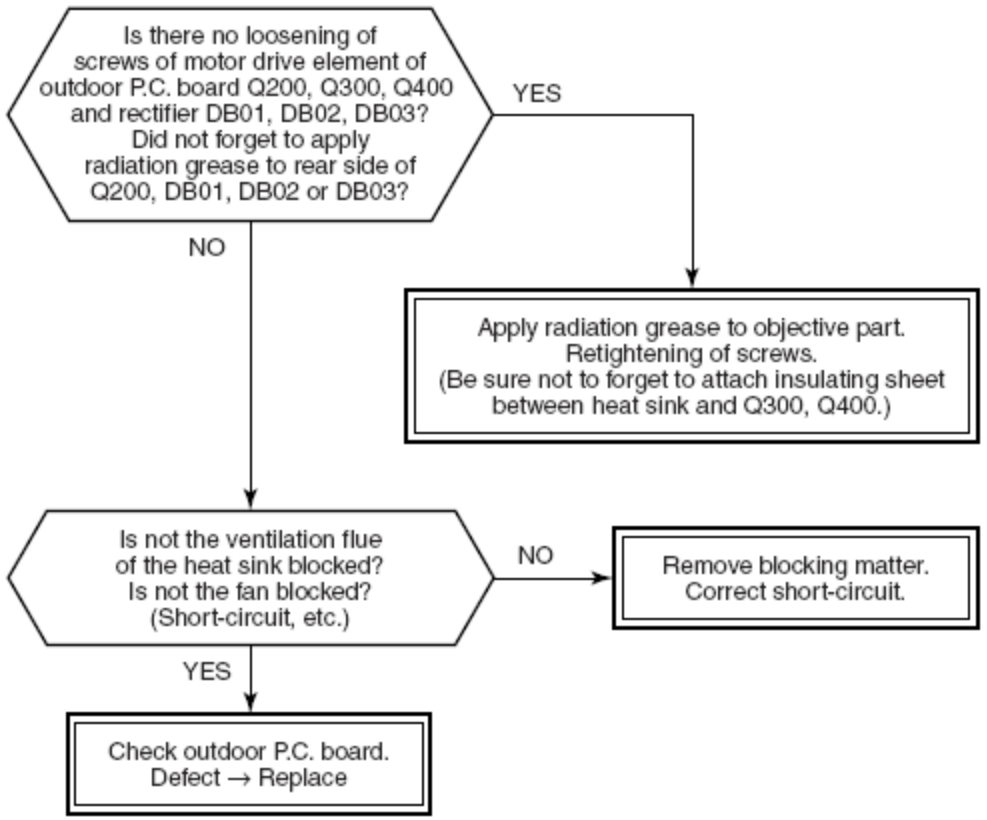
# RAV-SP240 - 420AT2-UL – [P05] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P05] | <Display 1> <Display 2> | [Power supply error (Voltage error)] |


Is there no down or up of power supply voltage? 208/230V ± 10V
YES
Confirm electric construction, etc.
NO
Check outdoor P.C. board. Defect → Replace

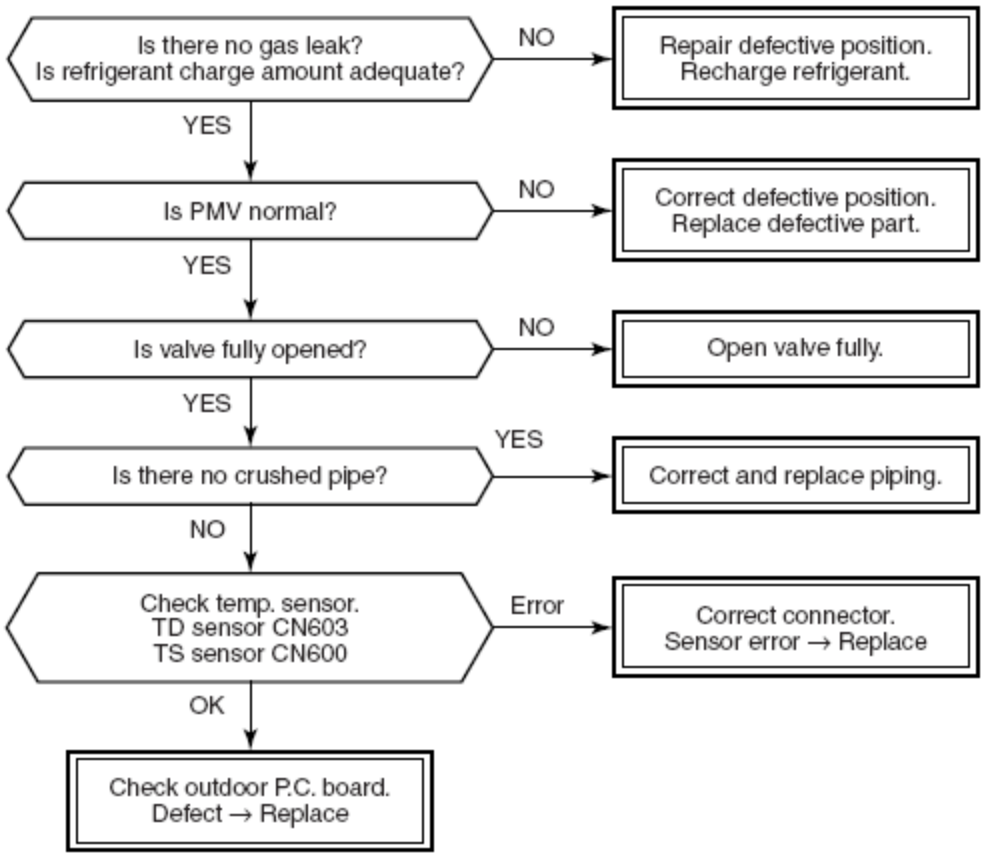
# RAV-SP240 - 420AT2-UL – [P07] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P07] | <Display 1> <Display 2> | [Heat sink overheat error] |


Is there no loosening of screws of motor drive element of outdoor P.C. board Q200, Q300, Q400 and rectifier DB01, DB02, DB03? Did not forget to apply radiation grease to rear side of Q200, DB01, DB02 or DB03?
YES
NO
Apply radiation grease to objective part. Retightening of screws. (Be sure not to forget to attach insulating sheet between heat sink and Q300, Q400.)
Is not the ventilation flue of the heat sink blocked? Is not the fan blocked? (Short-circuit, etc.)
NO
Remove blocking matter. Correct short-circuit.
YES
Check outdoor P.C. board. Defect → Replace

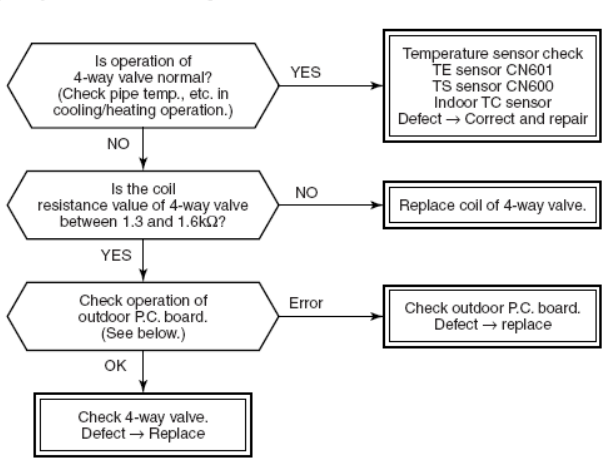
# RAV-SP240 - 420AT2-UL – [P15] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P15] | <Display 1> <Display 2> | [Gas leak detection] |



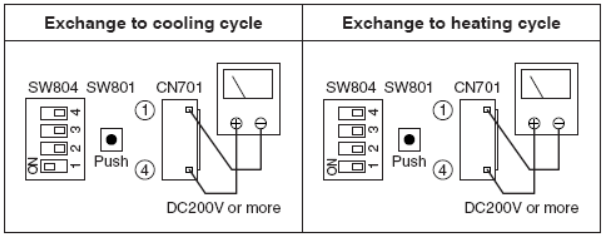
# RAV-SP240 - 420AT2-UL – [P19] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P19] | <Display 1> <Display 2> | [4-way valve inverse error] |


Is operation of 4-way valve normal? (Check pipe temp., etc. in cooling/heating operation.)
YES
Temperature sensor check
TE sensor CN601
TS sensor CN600
Indoor TC sensor
Defect → Correct and repair
NO
Is the coil resistance value of 4-way valve between 1.3 and 1.6kΩ?
NO
Replace coil of 4-way valve.
YES
Check operation of outdoor P.C. board. (See below.)
Error
Check outdoor P.C. board. Defect → replace
OK
Check 4-way valve. Defect → Replace

**Check method of outdoor P.C. board operation (Self-hold valve type)**

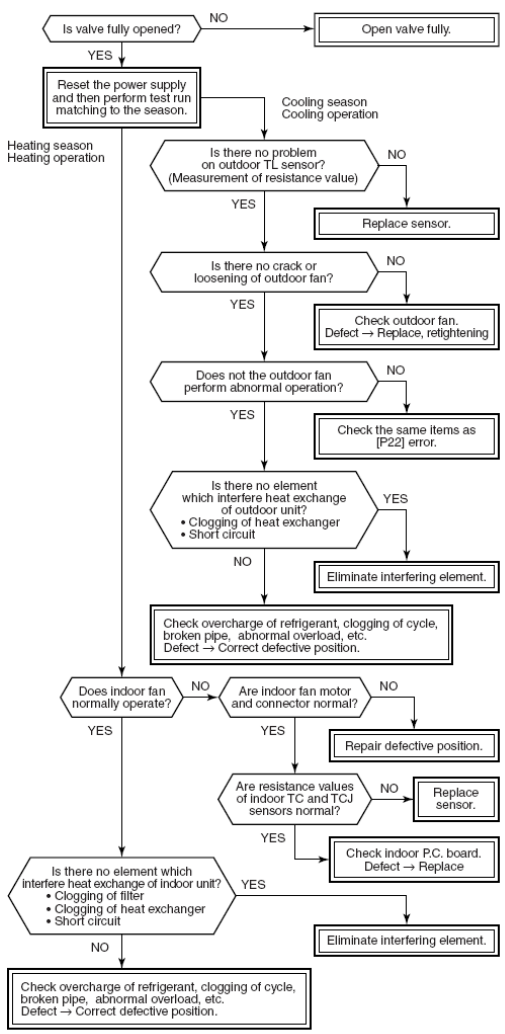
1) Set SW804 of Dip switch as the following figure and then push SW801 for approx. 1 second to check exchange operation to cooling cycle/heating cycle.
   - Power is turned on for approx. 10 seconds.
   - When checking again, check operation 1 minute or more after the first check because exothermic of part (Coil, resistance R700) is large. (There is no problem when coil is not connected.)
2) After check, turn off all the Dip switch SW804.




**Note)** Check by tester
Analog tester : Good if over DC200V
Digital tester : Good if Max. value is over DC200V though the varied value may be displayed.

# RAV-SP240 - 420AT2-UL – [P20] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention indicates part of outdoor unit.) |
|---|---|---|
| [P20] | <Display 1> <Display 2> | [High pressure protective operation] |


Is valve fully opened?
NO
Open valve fully.
YES
Reset the power supply and then perform test run matching to the season.
Cooling season
Cooling operation
Heating season
Heating operation
Is there no problem on outdoor TL sensor? (Measurement of resistance value)
NO
YES
Replace sensor.
Is there no crack or loosening of outdoor fan?
NO
YES
Check outdoor fan. Defect → Replace, retightening
Does not the outdoor fan perform abnormal operation?
NO
YES
Check the same items as [P22] error.
Is there no element which interfere heat exchange of outdoor unit?
• Clogging of heat exchanger
• Short circuit
YES
NO
Eliminate interfering element.
Check overcharge of refrigerant, clogging of cycle, broken pipe, abnormal overload, etc. Defect → Correct defective position.
Does indoor fan normally operate?
NO
Are indoor fan motor and connector normal?
NO
YES
YES
Repair defective position.
Are resistance values of indoor TC and TCJ sensors normal?
NO
Replace sensor.
YES
Check indoor P.C. board. Defect → Replace
Is there no element which interfere heat exchange of indoor unit?
• Clogging of filter
• Clogging of heat exchanger
• Short circuit
YES
NO
Eliminate interfering element.
Check overcharge of refrigerant, clogging of cycle, broken pipe, abnormal overload, etc. Defect → Correct defective position.



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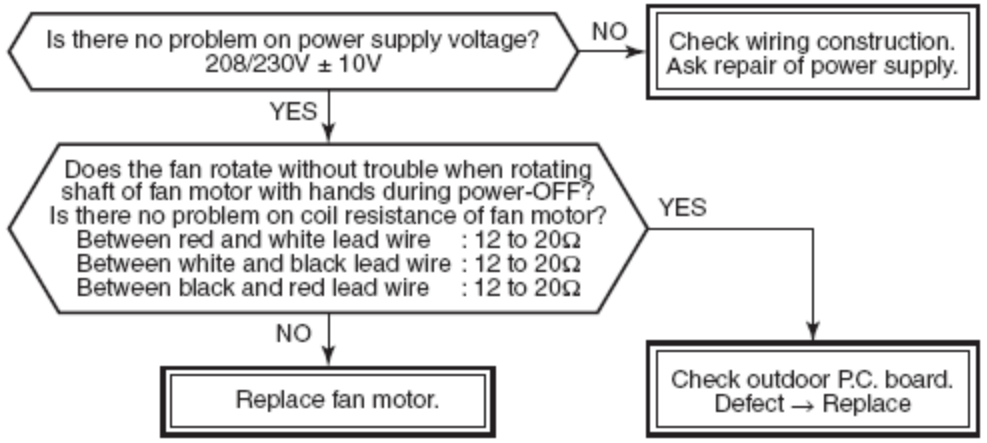
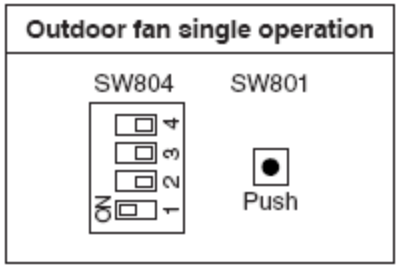
# RAV-SP240 - 420AT2-UL – [P22] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P22] | <Display 1> <Display 2> | [Fan system error] |


Is there no problem on power supply voltage?
208/230V ± 10V
NO
Check wiring construction.
Ask repair of power supply.
YES
Does the fan rotate without trouble when rotating shaft of fan motor with hands during power-OFF?
Is there no problem on coil resistance of fan motor?
Between red and white lead wire : 12 to 20Ω
Between white and black lead wire : 12 to 20Ω
Between black and red lead wire : 12 to 20Ω
YES
NO
Replace fan motor.
Check outdoor P.C. board.
Defect → Replace

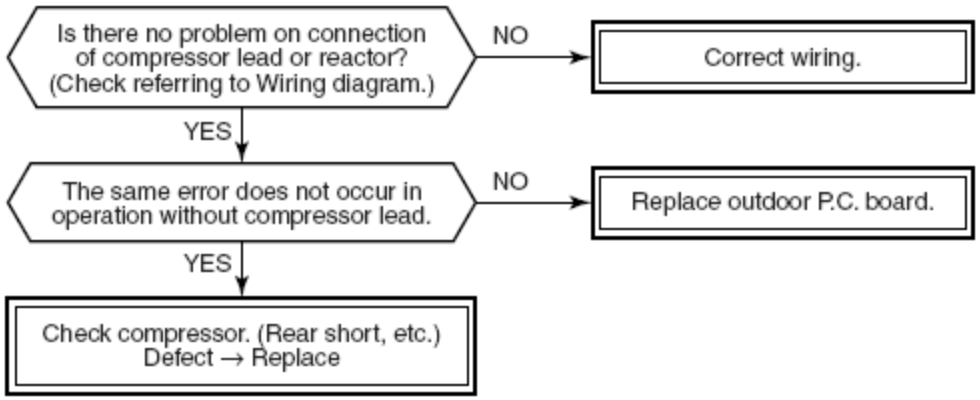
**Single operation check for outdoor fan**

1) Set SW804 of Dip switch as the following figure and then push SW801 for approx. 1 second to check single operation of outdoor fan. Use this method to check which fan, upper or lower fan, has a trouble.
   - When pushing SW801 for 1 second again or 2 minutes passed, the fan stops.
2) After check, turn off all Dip switch SW804.



# RAV-SP240 - 420AT2-UL – [P26] Error

| CODE No. | Outdoor LED display | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|
| [P26] | <Display 1> <Display 2> | [Short-circuit of compressor drive element] |


Is there no problem on connection of compressor lead or reactor? (Check referring to Wiring diagram.)
NO
Correct wiring.
YES
The same error does not occur in operation without compressor lead.
NO
Replace outdoor P.C. board.
YES
Check compressor. (Rear short, etc.) Defect → Replace

# RAV-SP240 - 420AT2-UL – [P29] Error

| CODE No. | Outdoor LED display | | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|---|
| [P29] | <Display 1> | <Display 2> | [Position detection circuit error] |
| | ○ | ◎ | Check outdoor P.C. board. Defect → Replace |
| | ○ | ● | |
| | ○ | ◎ | |
| | ● | ◎ | |
| | ○ | ◎ | |
| | ○ | ○ | |

# RAV-SP240 - 420AT2-UL – No Code Error

| CODE No. | Outdoor LED display | | Check and troubleshooting (Item without special mention Indicates part of outdoor unit.) |
|---|---|---|---|
| — No code | <Display 1> | <Display 2> | **[Other error]** Compressor disorder due to sudden change of load, etc.<br>* Although the display of outdoor LED outputs, the unit automatically restarts and error is not determined.<br>* LED display also may output due to negative phase of compressor or wire coming-off. |
| | ● | ◎ | |
| | ○ | ◎ | |
| | ○ | ◎ | |
| | ● | ◎ | |
| | ○ | ◎ | |
| | ○ | ○ | |

# Trouble Shooting High Wall Units

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

| Lamp indication | Check code | Cause of trouble occurrence |
|---|---|---|
| Ready ● Timer ● Operation ●<br>No indication at all | — | Power supply OFF or miswiring between receiving unit and indoor unit |
| Ready ● Timer ● Operation ☼<br>Flash | E01 | Receiving error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E02 | Sending error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E03 | Communication stop } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit |
| | E08 | Duplicated indoor unit No. } Setup error |
| | E09 | Duplicated master units of remote controller } Setup error |
| | E10 | Communication error between CPUs on indoor unit P.C. board |
| | E18 | Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor master and follower or between main and sub indoor twin) |
| Ready ☼ Timer ● Operation ●<br>Flash | E04 | Miswiring between indoor unit and outdoor unit or connection erorr (Communication stop between indoor and outdoor units) |

# Replacement Of Indoor Service P.C. Board

P.C. boards include a nonvolatile memory chip (EEPROM) that contains the following Information:

Model specific type information

Capacity codes

Factory set values

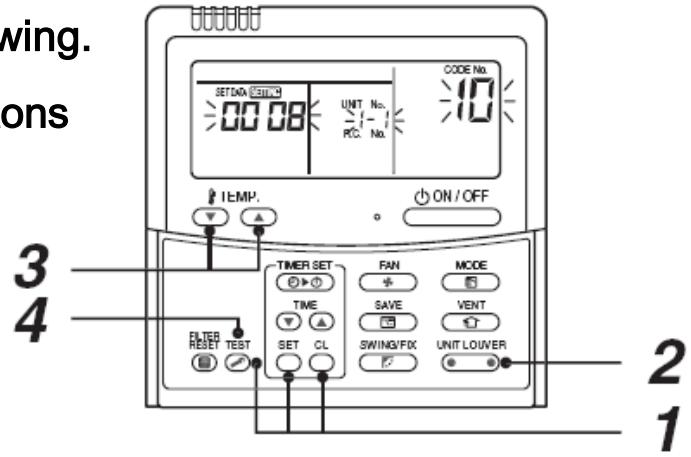
Set data that was manually or automatically set when the indoor unit was installed

When the board is replaced, the above information as well as the dip switches, and jumper wires need to be set.

# Step 1

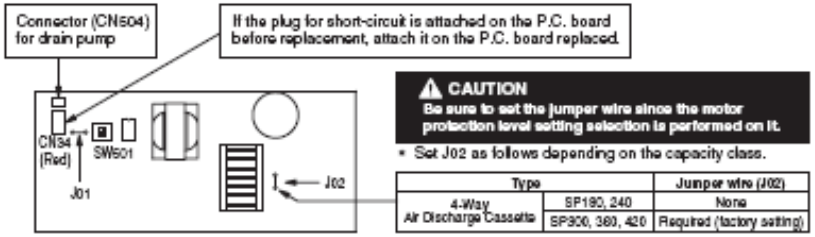
If possible read information from the EEPROM of the replaced board as follows:

1. Push SET, CL and TEST buttons (1) on the remote control simultaneously for more than 4 seconds. DN Code *10* is displayed , the indoor fan will run and the louvers will swing.
2. Change the DN code by pushing the up and down buttons for temperature control (3) to get to code *01*
3. The DN code ranges from *01 to FF*
4. Write down the required values.
5. Push the Test button (4) to return to normal operation

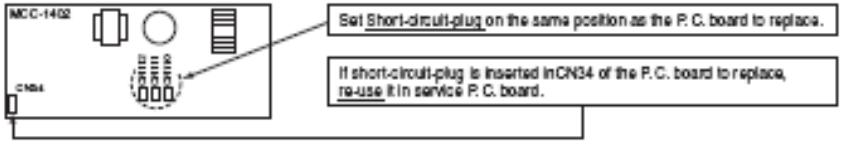


# Step 2 – Set Dip Switches and Jumpers on Replacement Board and Install it

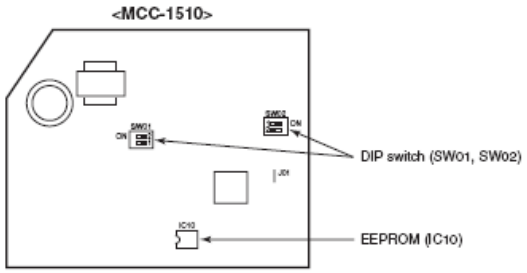
## Cassettes


Connector (CN504) for drain pump
If the plug for short-circuit is attached on the P.C. board before replacement, attach it on the P.C. board replaced.
CN34 (Red)
SW501
J01
J02
CAUTION
Be sure to set the jumper wire since the motor protection level setting selection is performed on it.
• Set J02 as follows depending on the capacity class.
Type
Jumper wire (J02)
4-Way Air Discharge Cassette
SP180, 240
None
SP300, 360, 420
Required (factory setting)

## Under Ceiling


MCC-1402
CN34
Set Short-circuit-plug on the same position as the P.C. board to replace.
If short-circuit-plug is inserted in CN34 of the P.C. board to replace, re-use it in service P.C. board.

## High Wall




Duplicate the settings from the board that is being replaced

# Step 3 – Turn On The Indoor Unit

Auto addressing is initiated. The procedure requires approximately 5 minutes. It sets the System address =1, Indoor unit address =1, Group address = 0

For 1:1 systems this process can be interrupted by pushing the SET, CL, and TEST buttons simultaneously for more than 4 seconds. (in unit number *ALL* is displayed)

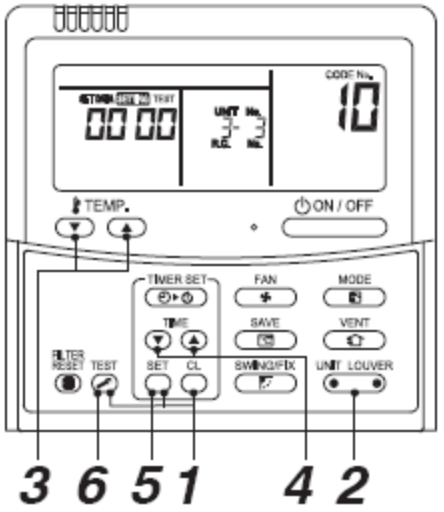
# Step 4 – Write the Set Data to EEPROM

1. Push SET, CL and TEST buttons on the remote control simultaneously for more than 4 seconds. DN Code *10* is displayed ,the indoor fan runs and the louvers swing (6,5,1).
2. Select type by pushing the timer up and down buttons (4) and then pushing SET (5).
3. Change DN Code to *11* by pushing temperature up and down buttons (3).
4. Select capacity by pushing the timer up and down buttons (4) and then pushing SET (5).
5. Push TEST button (6) to return to normal display.
6. Write the contents that were read from the replaced board. If data could not be read, set up the unit again.
7. Write data by :

   Repeating 1 above

   Change DN Code to *01* by pushing temperature up and down buttons (3).

   Scroll through DN Codes, change values when necessary by pushing the timer up and down buttons (4) and then pushing SET (5)
8. After completing the setup push TEST (6) .



# Replacement of Outdoor Service P.C. Boards

3 replacement boards are available

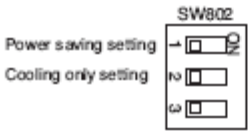
- RAV-SP180AT2-UL
- RAV-SP240AT2UL
- RAV-SP300-420AT2UL

Before board replacement:

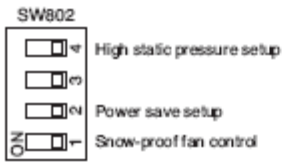
- Set Dip switches
- Set Jumper wires

# Dip switch settings

<RAV-SP180AT2-UL>

| Function | Set position | Control contents |
|---|---|---|
| Power save setup |  | When using the power saving function, turn on switches.<br>The control to lower the compressor frequency (approx. -10%) is performed by indoor heat exchanger temp. in heating operation. |
| Cooling-only setup | | When using the outdoor unit as a cooling-only machine, turn on switches. ("OF" of DN cord on the remote controller also can be used for changing the machine to the cooling-only model.) |

<RAV-SP240, SP300, SP360, SP420AT2-UL>

| Function | Set position | Control contents |
|---|---|---|
| High static pressure setup |  <br>* all are OFF at shipment. | Turn the switch to ON when mounting a duct to the discharge port of the outdoor unit.<br>Add 3 taps to the upper limit value of the outdoor fan tap.<br>The operation is performed with (Max: Upper fan: 890 rpm / Lower fan: 910 rpm (WF)).<br>In this case, the upper limit value of static pressure for duct is 5Pa or less on 77°F (25°C) degrees and please use straight duct.<br>In this case, the outdoor noise level may increase. |
| Power save setup | | Turn the switch to ON when using the power save function.<br>The control to lower the compressor frequency (Approx. –10%) is performed by indoor heat exchanger temp. in heating operation. |
| Snow-proof fan control | | When snow enters from clearance of the fan guard or heat exchanger into blast path and it is accumulated, the control to prevent generation of motor lock is validated.<br>When outside temp. is below 32°F (0°C) though the compressor stops, the outdoor fan operates with W5. |

Set all SW803 dip switched (LED indication) to OFF

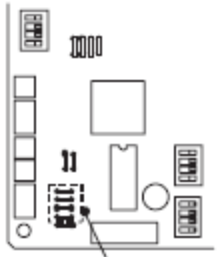
Set all SW804 dip switched (Special operation for service) to OFF

# Set Jumper Wires

Model switching – Sizes 300 through 420 use the same board. Set up the board for the correct model by cutting the jumper wires per the table below.

| Model name | J 800 | J 801 | J 802 | J 803 |
|---|---|---|---|---|
| Factory setting (default) | ○ | ○ | ○ | ○ |
| RAV-SP300AT2-UL | ○ | × | ○ | × |
| RAV-SP360AT2-UL | × | × | ○ | × |
| RAV-SP420AT2-UL | ○ | ○ | × | × |

○ : Connected, × : Cut




If board is not setup properly, L10 or L29 error will be displayed (wired control) and unit will not operate

Unit setup

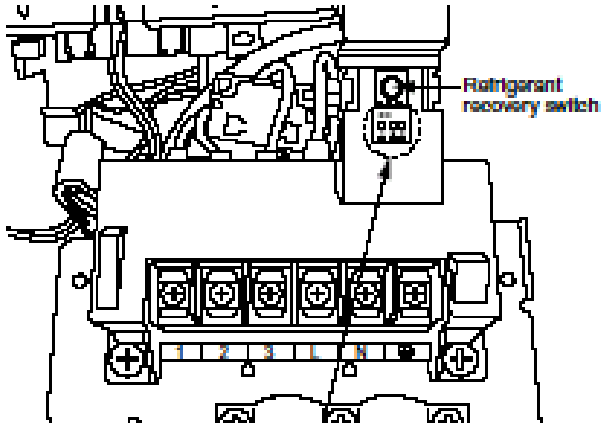
| | | |
|---|---|---|
| Defrost time change | J805, J806 | The defrost interval is cut to shorten it than the standard status.<br>For contents of control and cutting method, refer to **10. Defrost control** (See to Page 43). |
| Max. frequency change | J807 | When it is needed to lower the maximum value of the compressor frequency, cut the jumper line. Max. frequency at cooling/heating is lowered.<br>In this case the Max. capacity decreases.<br>**Max. frequency of compressor** |
| Cooling-only setup | J808 | When using the air conditioner as a cooling-only conditioner, cut the jumper line. (An air conditioner can be changed to cooling-only conditioner by "0F" of DN code on the remote controller.) |

| RAV-Model | SP240 | | SP300 | | SP360, SP420 | |
|---|---|---|---|---|---|---|
| | COOL | HEAT | COOL | HEAT | COOL | HEAT |
| Standard status | 72.0 | 99.6 | 58.4 | 71.4 | 64.2 | 90.6 |
| When J807 is cut | 72.0 | 79.2 | 58.4 | 64.2 | 64.2 | 72.0 |

# Refrigerant recovery function (Forced cooling operation mode)

RAV-SP180AT2-UL

1. Turn on the power supply.
2. Using remote controller, set fan operation to indoor unit.
3. Fully close liquid side valve.
4. Pushing refrigerant recovery switch on terminal block, unit starts forced operation (Max 10 min), then refrigerant gas is recovered to outdoor unit through gas side valve.
5. After recovery is completed, close gas side valve, then push recover switch.
6. Forced cooling operation stops.
7. Turn off power supply.




RAV-SP180AT2-UL

DANGER

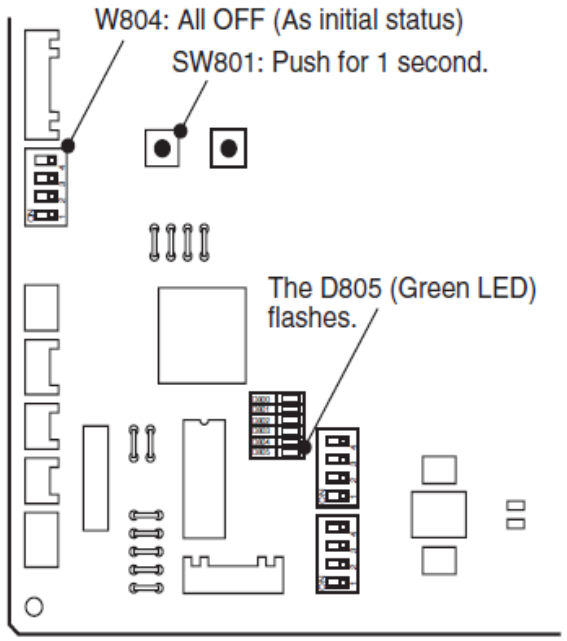
Take care for electric shock, because control P.C.board is energized.

# Refrigerant recovery function (Forced cooling operation mode)

## RAV-SP240/300/360/420AT2-UL

### [Operation method]

1) Set the mode of the indoor unit to fan mode.
2) Set all DIP switch SW804 to OFF (Initial status) and then push the button switch SW801 for approx. 1 second. The cooling operation starts. (During this time, D805 (Green LED) flashes.)
   This operation finishes by 10 minutes.
3) After operation for 3 minutes or more, close valve at liquid side.
4) After recovery of refrigerant, close valve at gas side.
5) Push the button switch SW801 again for approx. 1 second.
   The outdoor unit stops.
6) Stop the indoor unit and then turn off the power supply.




DANGER

**Take care for electric shock, because control P.C.board is energized.**

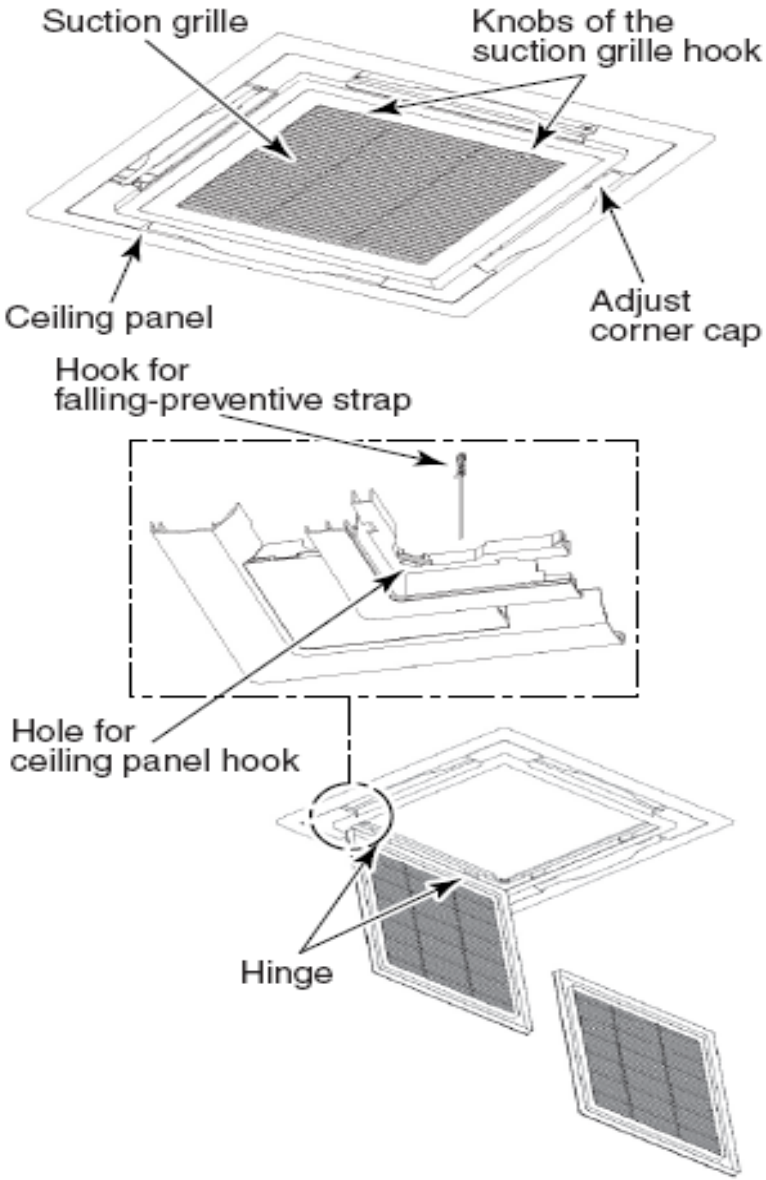
# Forced Defrost – Wired Remote Control Only

1. Remote has to be turned off
2. Push the TEST +SET+CL simultaneously for 4 seconds or more
3. If a group control is setup, push UNIT button to select the unit that requires defrost
4. Use the temperature UP and DOWN buttons to select DN Code 8C
5. Use timer UP and Down buttons to set code to 0001 (0000 set from factory)
6. Push SET button. (OK if indication is displayed)
7. Push TEST button to return to normal status.
8. Push ON/OFF button
9. Select HEAT mode
10. Defrost operation is initiated and will last for a maximum of 12 minutes
11. After defrost is terminated, the operation returns to HEAT MODE
12. If additional defrost is required, repeat steps 1 through 11

# Cassettes Service Procedures

**To remove the grille:**

**Push the two slide latches away from you and drop the grille.**
**Detach the hook (connected to the strap connected to the grille) from the corner**
**If you wish to remove the grille, tilt the grille at a 45° angle and push upwards.**




**To attach the grille:**

**Reverse above steps.**

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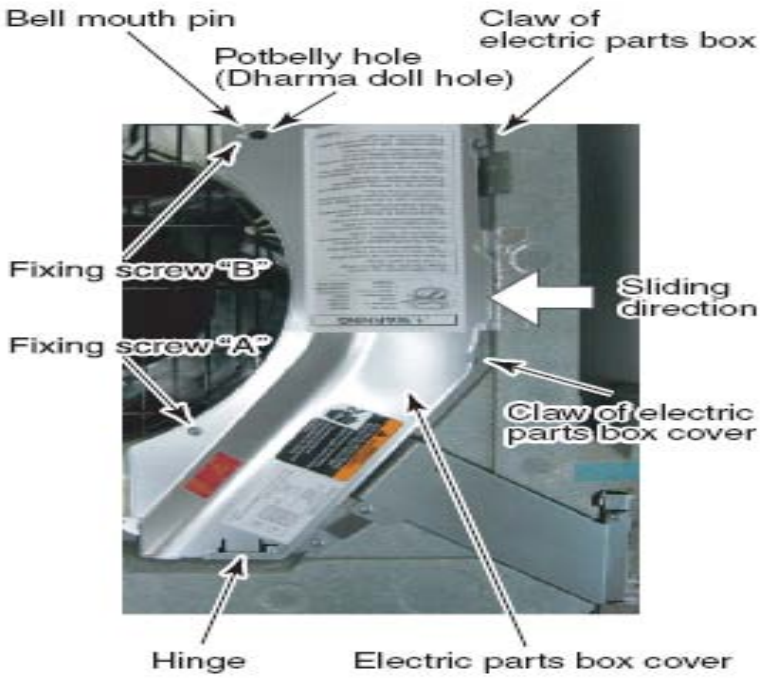
## Removing the control box cover

Remove or drop the grille
Remove screw A
Loosen screw B (connected to a key hole)
Drop the control box cover
Control box cover can be removed by tilting it at an angle and sliding it out
A wiring diagram is located on the inside of the cover



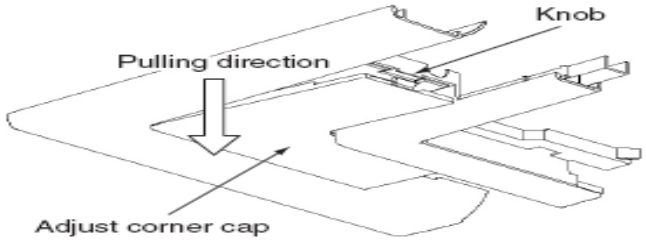

## Attaching the control box cover

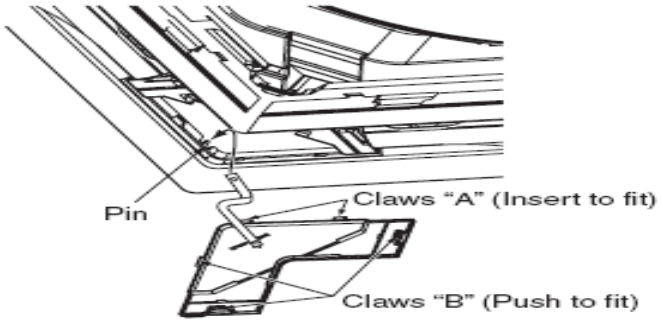
Reverse the above steps
When putting the cover back make sure that the lip in the cover slides into the slot and the plastic pin is in the hole next to the B screw

Back to main menu  Back to Service

## Removing the corner cap

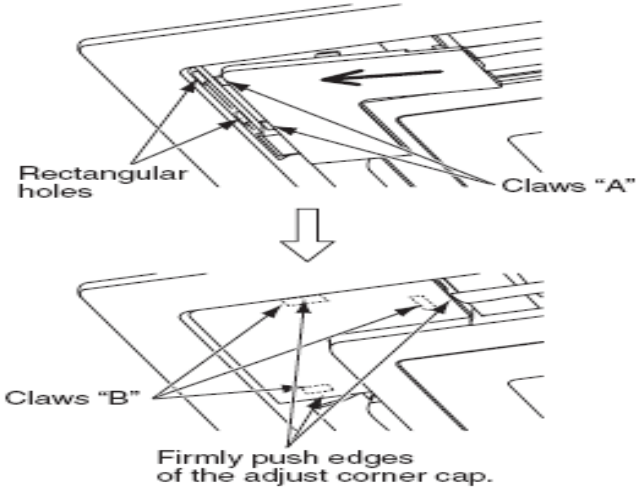
**The corner caps are removed to either adjust the unit (leveling) or to install the receiver for a wireless remote**
**Pull knob of the corner cap downwards**
**The corner cap is attached to the panel by a strap attached to a pin on the grille**




## Replacing the corner cap

**If removed, connect the strap to the on the grille**
**Insert the A claws into the horizontal slots**
**Push the edges of the corner cap in place**

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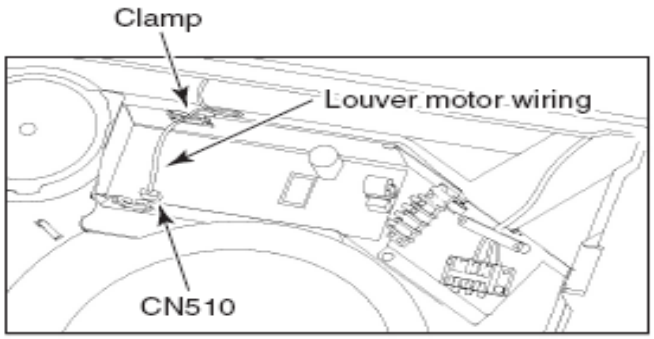
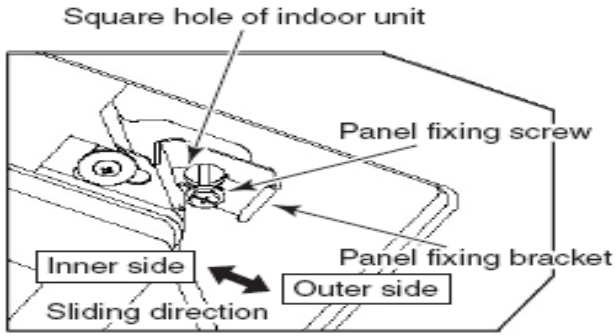
## Removing the grille and frame

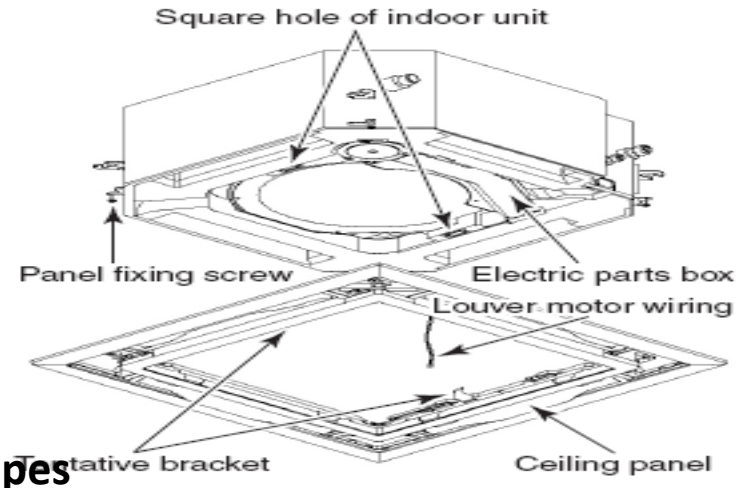
**Remove the control box cover**
**Remove the four corner caps**
**Unplug the louver connector (CN510) from the control box and remove the wire from clamp**




**Loosen the panel 4 fixing screws**
**Slide the panel fixing bracket outlet**
**Panel is held in place by tentative clip (bracket) shown on next slide**



**Push the tentative clips outwards and remove the panel.**

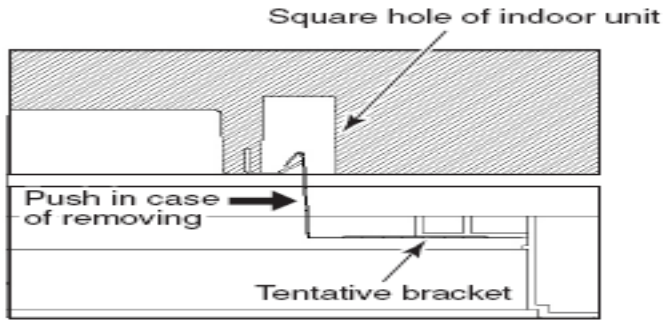



## Attaching the grille and frame

**Orient the frame in the right direction. I.E. the louver motor connector is on the side of the control box. The frame has protruded plastic shapes that will fit into the unit to ensure proper orientation.**

**Attach the frame using the tentative clips. The frame will be loosely connected to unit**

**Reverse the steps outlined in removing the grille and frame section**

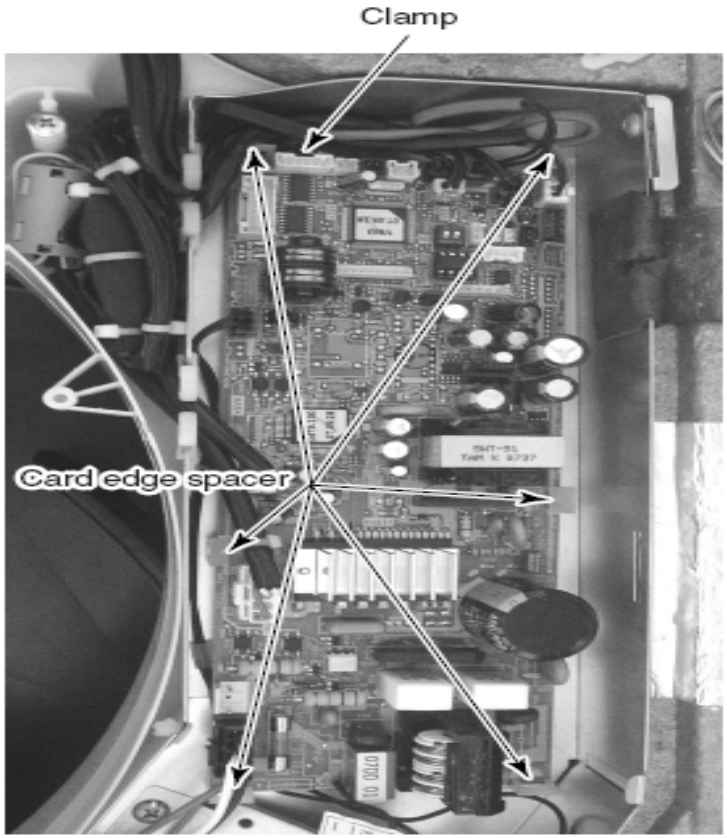


## Removing the control board

**Remove the grille**
**Remove the cover of the control box**
**Remove the following connectors from the board by unlocking the clip on the connector:**

- **CN510: Louver motor – 20 wires**
- **CN34 : Float switch – 3 wires**
- **CN504: Drain pump – 2 wires**
- **CN101: TC sensor – 2 wires**
- **CN102: TCJ sensor – 2 wires**
- **CN104: Room temperature sensor – 2 wires**
- **CN333: Fan motor power supply – 5 wires**
- **CN334: Fan motor position detection – 3 wires**

**Unlock the 6 board clips (edge spacer) and remove the board**

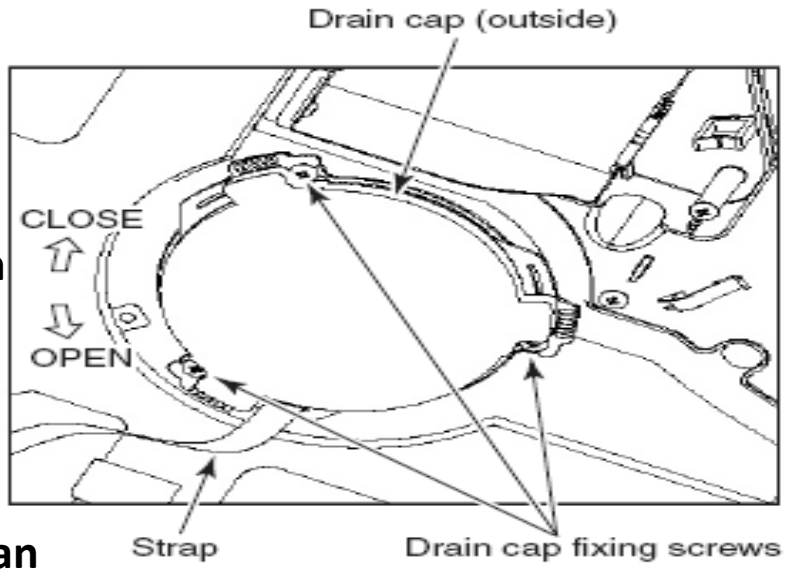



## Installing the control board

**Reverse the above steps**

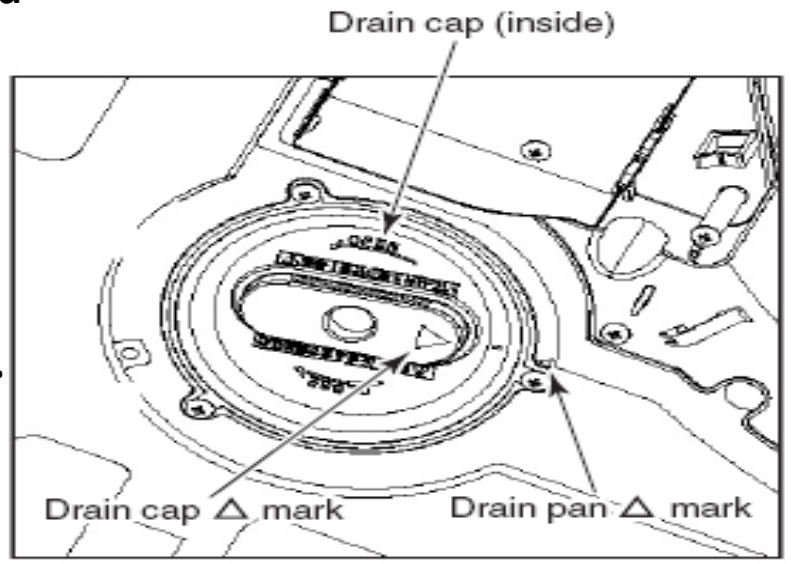
Back to main menu  Back to Service

## Remove the Drain Cap




**Remove the grille**
**Loosen the three screws and turn the Drain Cap cover in the direction of the open arrow and remove the cap**
**The cap cover is connected with a strap**
**Loosen the cap by turning it approximately one turn in the direction of the open arrow**
**Drain the water accumulated in the drain pan**
**Turn the Drain Cap in the open direction and remove it completely**

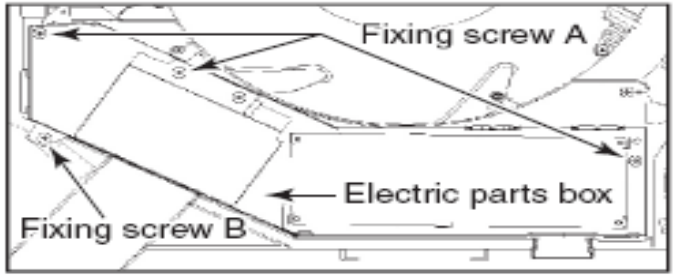
## Attaching the Drain Cap

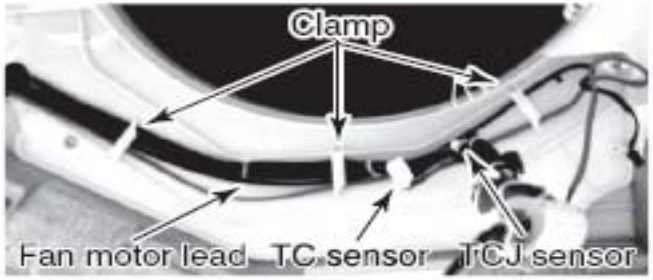



**Insert the Drain Cap and turn it in the direction of the close arrow until it cannot be turned anymore. Drain pan marks align.**
**Reverse the above steps**

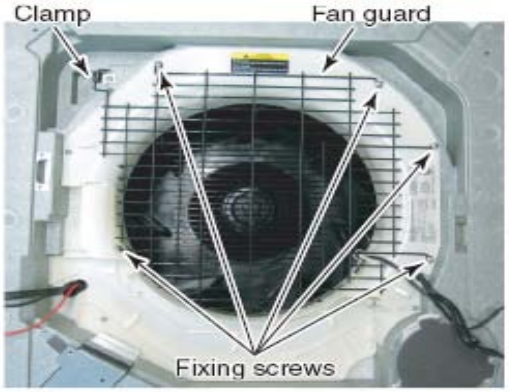
## Removing the fan motor

**Remove the grille and frame**
**Remove the control box cover**
**Unscrew the power supply and remote control wires from terminal blocks**
**Unplug the connectors from control board**
**Remove the fixing screws A (qty 3) and B (qty 1) and remove control box**
**Remove the fan motor, the TC, and TCJ sensor leads from the clamp on the bell mouth**

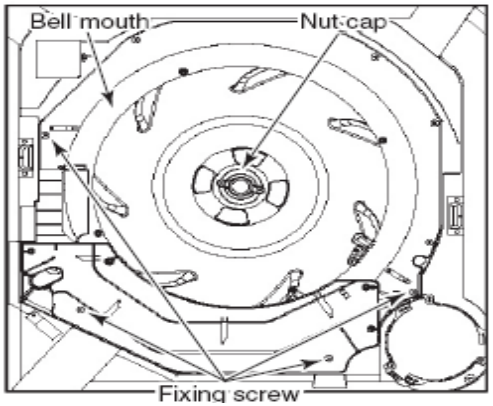


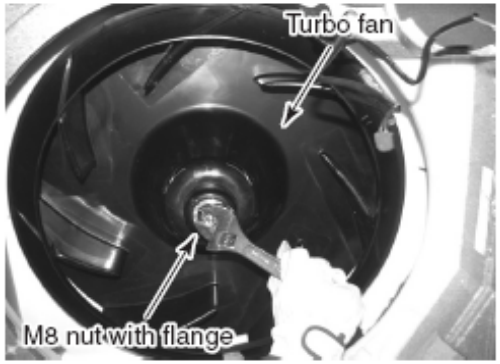



## Removing the fan motor continued




**Remove the fixing screws holding the fan guard. Fan guard hangs from a clip.**
**Remove the fixing screws and remove the bell mouth**
**Remove the nut cap by removing 2 screws**
**Remove the turbo fan by removing the nut**

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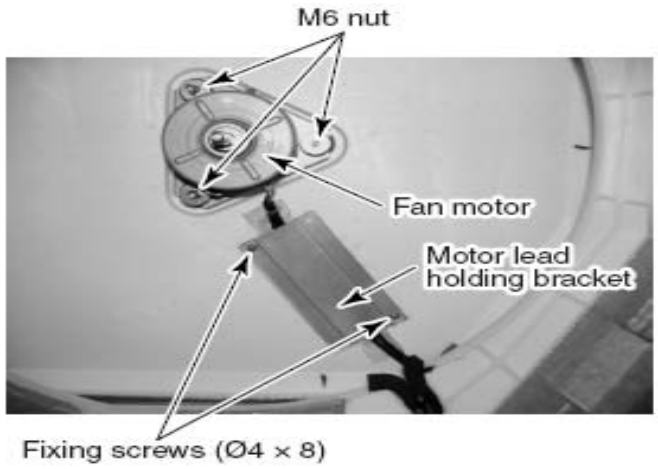
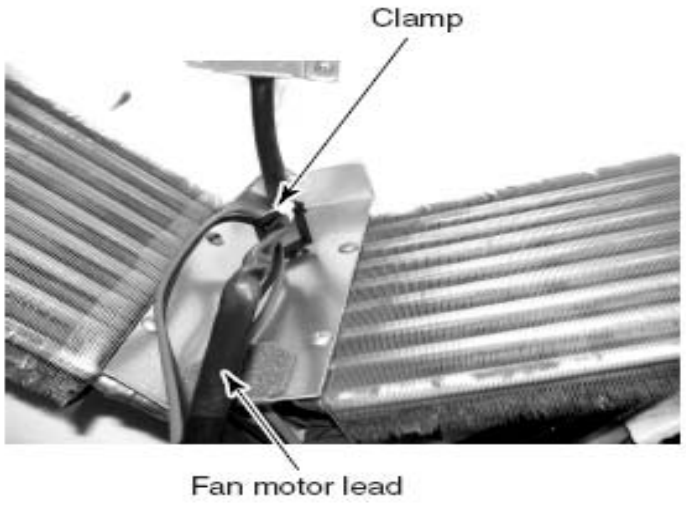
## Removing the fan motor continued

Remove the motor lead holding bracket by unscrewing two screws
Cut the bundling band and remove the wires from the clamp
Unscrew the three fixing nuts to remove the motor




## Replacing the fan motor

Reverse the earlier steps
Note: When replacing the motor make sure:
- Wires are tight with no slack
- The D cut on the fan matches the D cut on the motor shaft

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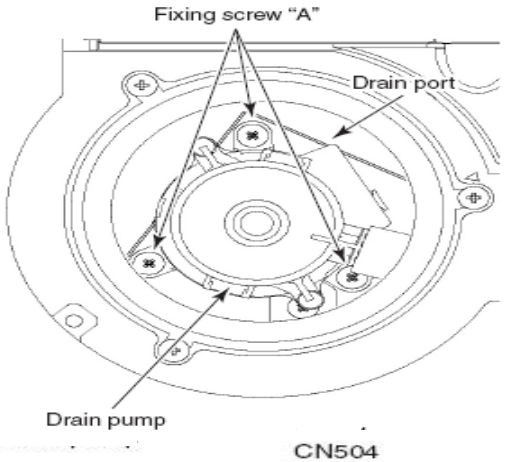
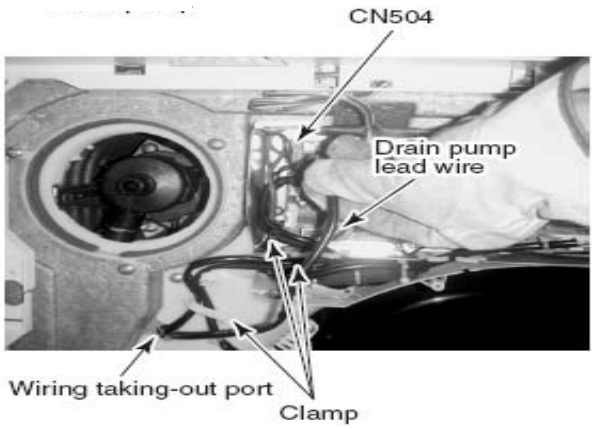
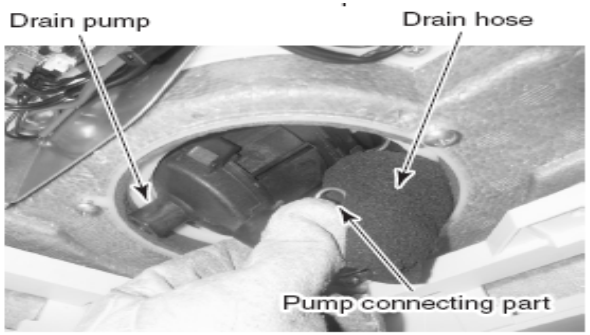
## Removing Drain pump

**Remove control box cover**
**Remove Drain Cap**
**Remove drain pump connector (CN504, white, 2P) from control board and remove wire from clamp**
**Remove the 3 screws holding the pump to the bracket**
**Pull out the connecting part of the drain pump and drain hose from the drain port and then take the drain pump out**

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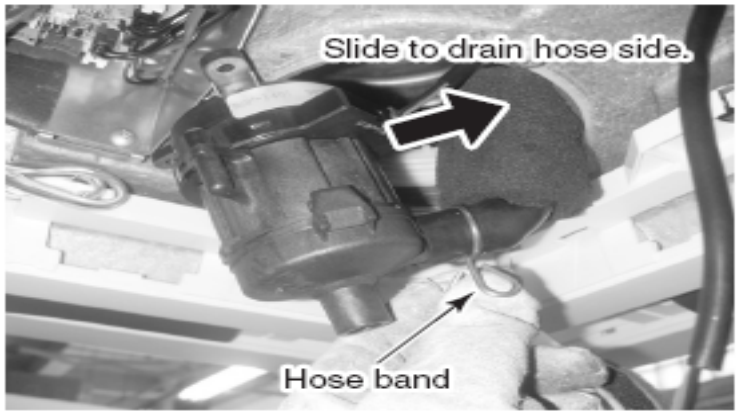
## Removing Drain pump continued




Move the hose band away from the connecting part of the pump and remove the hose from the pump

Free the connecting pump wires and remove the pump

## Installing Drain pump

Using your hand, pass the pump wires back to the control board

Reverse the steps outlined above

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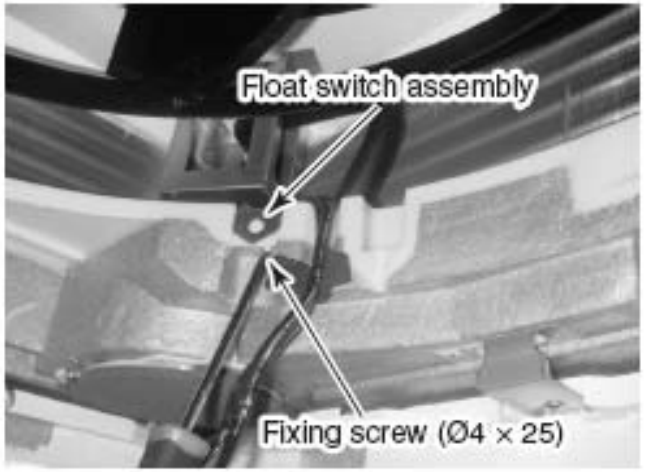
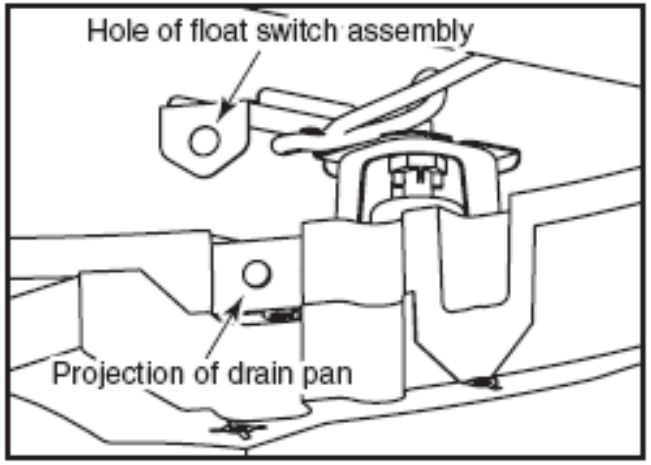
## Removing Float Switch

Remove bell mouth (see steps outlined in removing fan motor)
Remove the fixing screw




## Installing Float Switch

Reverse above steps

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